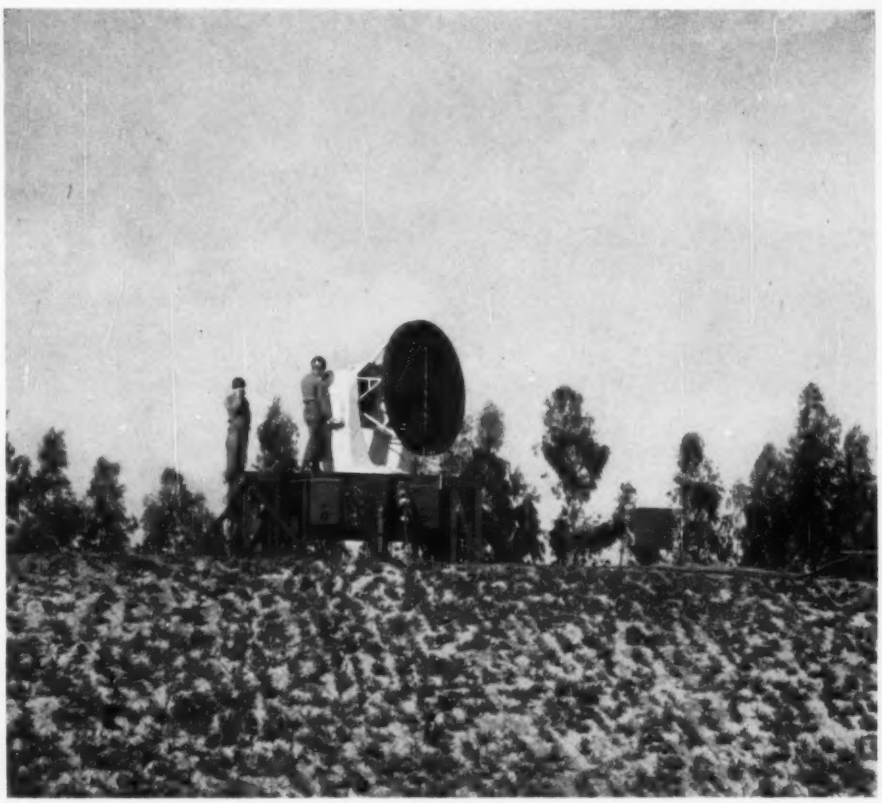
JULY 5, 1958
VOL. 155 — NO. 1

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY



SAGE SYSTEM

A missile-tracking or target radar, a unit of our air defense system. Information from such units feeds into SAGE system which uses commercial telephone circuits. SAGE story, page 19.

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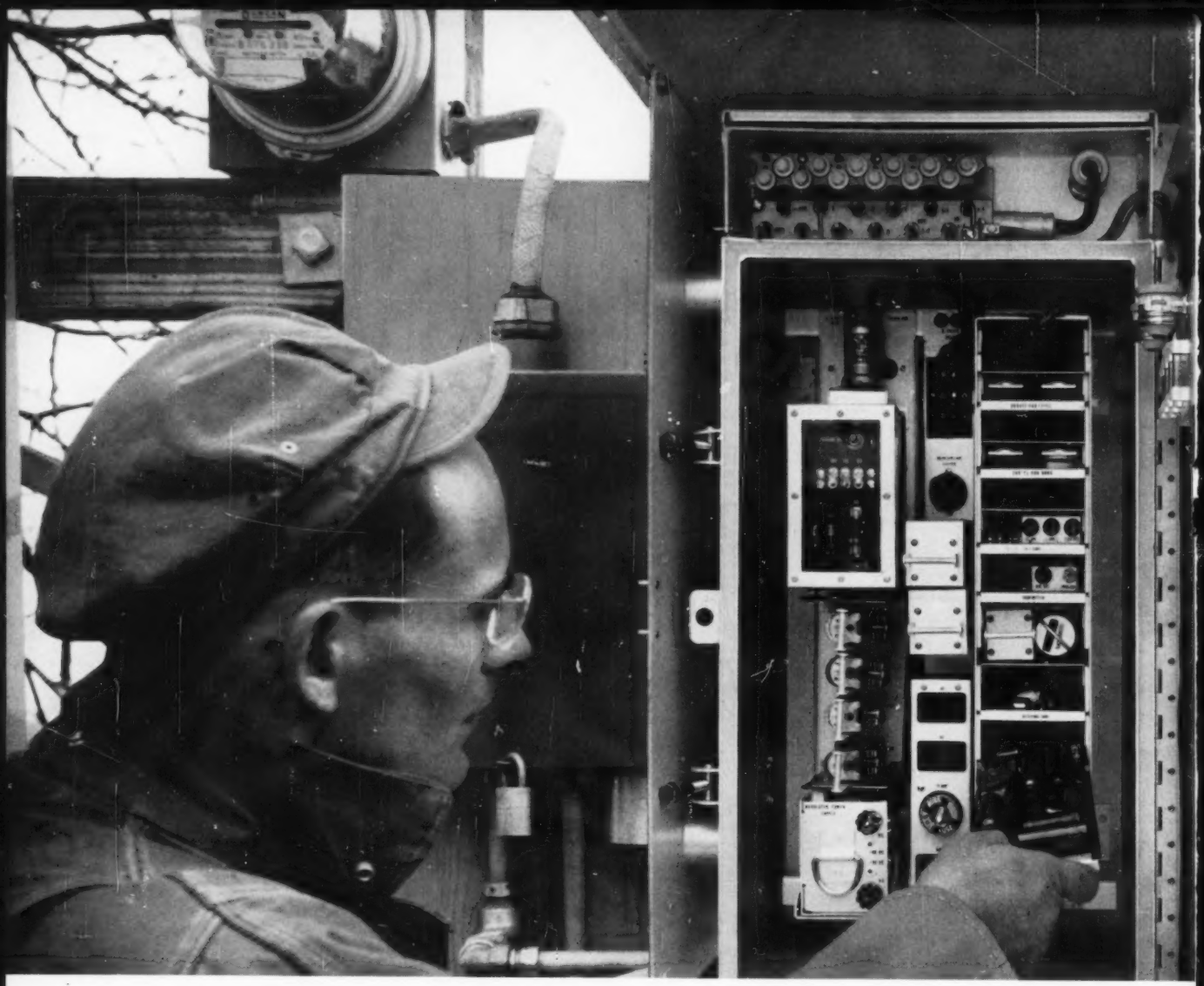

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FLASHES AND PLUGS

HATCHING POST. In Sunol, Cal., Eneas Kane stopped to make a telephone call at a battered old booth on the outskirts of town.

He was halted at the door by this sign: "Don't use this telephone until eggs are hatched."

Inside was a tiny humming bird's nest, woven in the coin return slot. There were three tiny eggs.

Kane postponed his telephone call.

•

NAMES TELL THE STORY. A Burbank, Cal. teacher seeking relief from examination papers amuses herself by thumbing through the telephone directory putting surnames together for appropriate occupations. She says it's as relaxing as acrostics and not nearly so demanding.

So far she's come up with Treloggen-Plank Lumber Co.; Grow & Rich Investment Brokers; Burns, Boyle & Melton Electrical Appliances; Hollers & Heller Party Supplies; Haddock, Doe & Stagg Taxidermists, and Howell, Bragg & Noyes Public Relations.

All are fictional, of course, including her comedy act, Tallman & Shaver.

•

LOST WEEKEND? The telephone operator was having trouble getting up in the morning, so her doctor prescribed some special pills. She took the pills, slept well, and was awake before the alarm sounded. She took her time getting to work, strolled in, and smiled pleasantly at the chief operator, as she said:

"I didn't have a bit of trouble getting up this morning."

"That's fine," was the reply, "but where were you yesterday?"

•

SLIGHT OVERSIGHT. Olsen in Denmark is as popular a name as Smith in the United States. In fact the name takes up 60 columns in the Copenhagen telephone directory.

Or, rather, it usually does. According to a report from United Press International, in the new Copenhagen directory, the printers forgot the Olsens.

•

BUILDING MONEY. The operator of a Tokyo taxicab company telephoned the police upon discovering that someone had stolen 80,000 yen from his home.

The culprit turned out to be a mouse which used the bills for constructing a nest behind the pantry door.

CHANGE OF ADDRESS

Please notify your local postmaster and the Circulation Dept. of TELEPHONY of change of address. Change cannot be made without the old as well as the new address. Allow three weeks for change of address to become effective.

Telephony

THE JOURNAL OF THE TELEPHONE INDUSTRY
Since 1901

July 5, 1958

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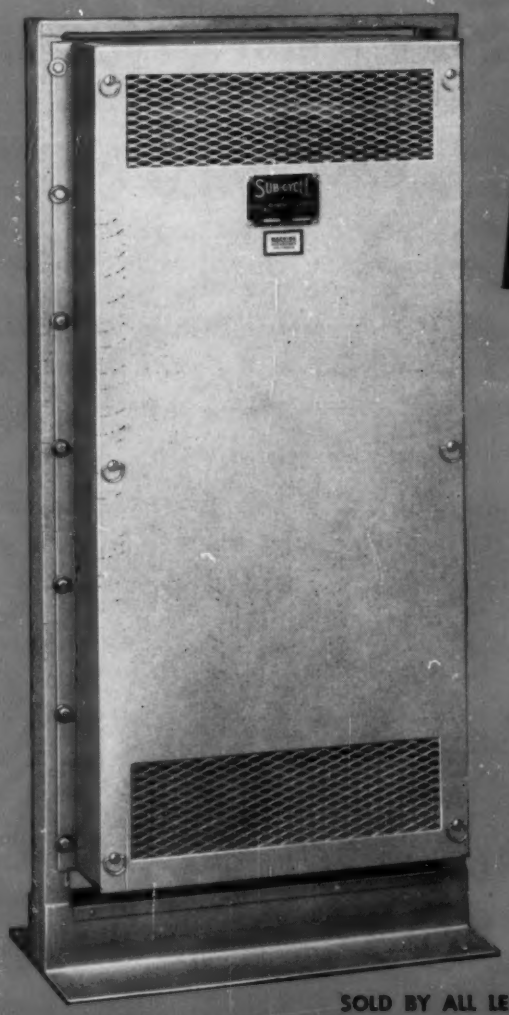

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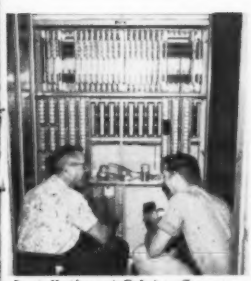

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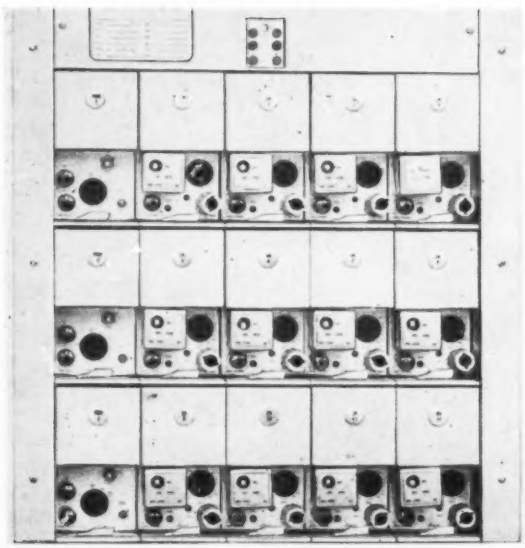
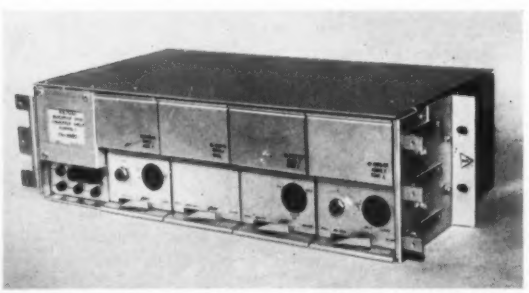


Typical Lenkurt 45-Class Basegroup Channel Bank provides channelizing and grouping equipment for 12 voice channels, yet occupies only 22¾ inches of vertical rack space. Type 45C Carrier provides for economical expansion in 4-channel groups by the simple addition of interchangeable plug-in units.



Lenkurt Basegroup Transfer-Converter permits transfer of 12-channel groups between Lenkurt 45-Class systems and Western Electric J, K, L, or CCITT conforming systems. It eliminates expense of extra channelizing equipment—permits different carrier systems to be connected in tandem without demodulating the individual carrier channels to voice frequency.

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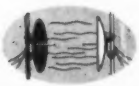
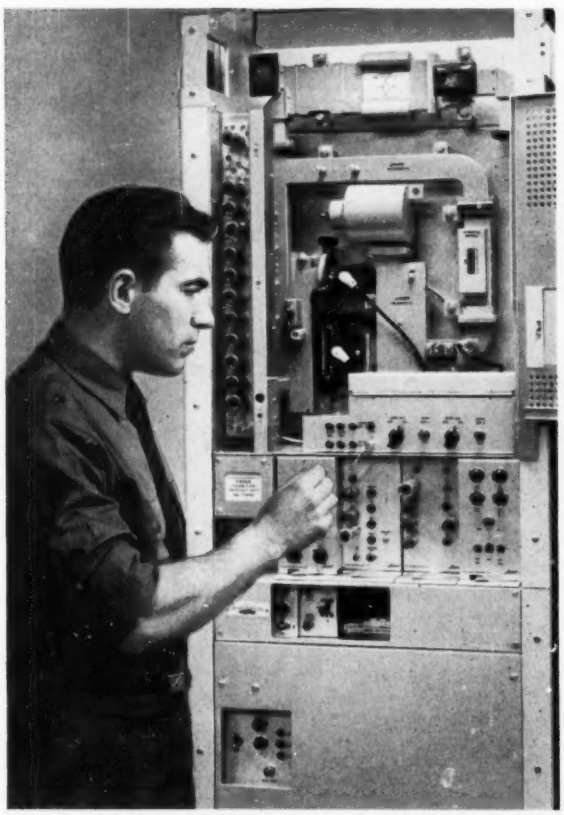

open wire

or cable

at carrier frequencies!



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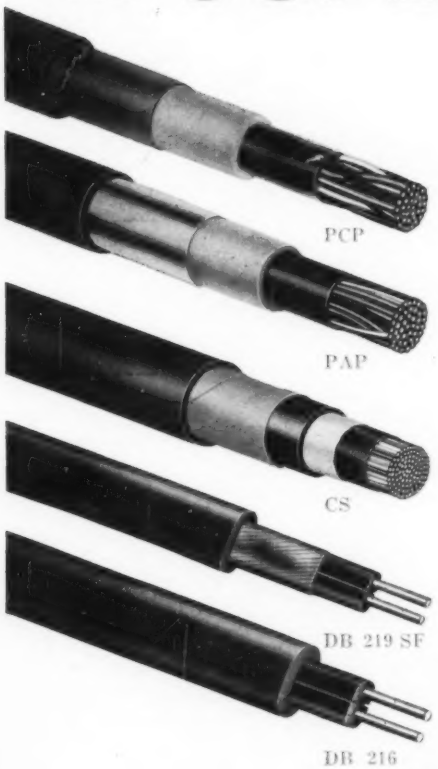

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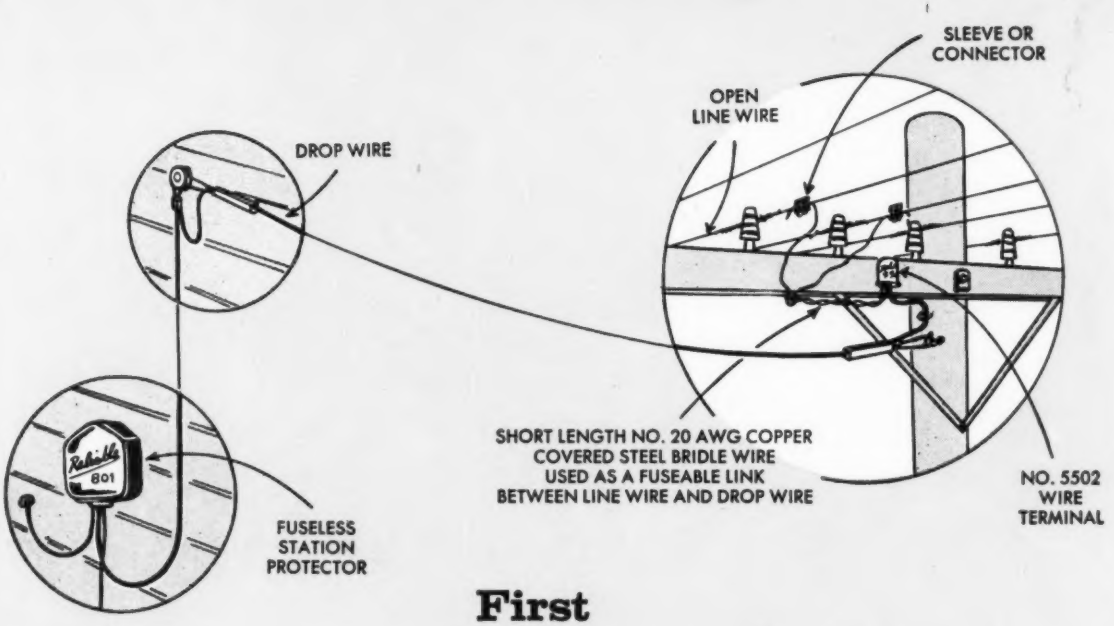
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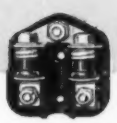

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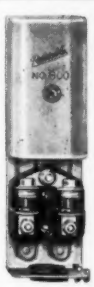

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For more information, write and ask us about the new Series 5400 Multiple-Speed Earth Borer.

IN THE NATION'S CAPITAL

BY FRANCIS X. WELCH, WASHINGTON EDITOR

FCC interim order of a 15 per cent cut in Bell System leased-line rates bears important implications for all telephone companies. *Electrical World* study shows good earnings benefit customer *and* stockholder. Makes plea for more wire-tap leeway. Disclose details on SAGE.

THE SUDDEN and somewhat unexpected action of the Federal Communications Commission in cutting Bell System's leased-line rates approximately 15 per cent is a recent Washington development which should be of the greatest concern to the entire telephone industry. It appears that the FCC (Commissioner Craven dissenting) has embarked on a rather radical principal of allocation of the rate of return allowance in rate regulation. Specifically the FCC has ordered the American Telephone & Telegraph Co. to file revised tariffs effective 60 days after June 25 to reduce rates on certain types of private line telephone service by approximately 5.7 million dollars a year, based on 1955 traffic volume.

The justification given by the FCC for its order, which grew out of a 1955 complaint filed by the General Services Administration, was that the AT&T is making too much profit on private line service under present rates. According to the FCC, the AT&T's net return on total interstate net investment was approximately 7 per cent; that means the AT&T's return on all of its interstate business, of which private line service accounted for about 3 per cent of the company's gross interstate revenues. But the FCC analysis claims that the present rates on private line telephone facilities result in a return of 10.5 per cent for that particular type of business.

And so the FCC cut is ostensibly to bring the private line business earnings more into line with the general average earnings of total interstate business. Furthermore, bearing in mind that this is only a peremptory or interim rate cut and that the General Services Administration originally asked for a 25 per cent decrease, there is no assurance whatever that the FCC may not eventually order an even larger reduction.

As a matter of fact, the FCC order hinted that it had that in mind when it stated that the interim reduction is "not to be construed in any way as indicative of what we may eventually determine, upon a full and complete hearing record, to be a reasonable level of earnings for the services in question, or of what other determination may be made at that time with respect to any of the rate-making questions involved in this proceeding."

The reaction of the AT&T came promptly in the form of a statement by its president, Frederick R. Kappel, who denied that there was any justification for cutting rates on any part of Bell System interstate business. On the contrary, the Bell System chief executive stated: "These rates are already too low." According to Kappel, the FCC order will result in earnings on private line business (both telephone and telegraph) being slashed to a "confiscatory level of less than 4½ per cent despite the fact that current rates for these services are from 30 per cent to 50 per cent below prewar levels."

Obviously the Bell System rate-of-return figures do not square with the estimate of the FCC. Leaving these statistical differences to one side, there still remains a matter of principle. The very phrase "general average" implies difference in component parts. If every percentage of return for particular lines of business in excess of a general average were to be constantly knocked down to conform to the general average, the general average itself would drift lower and lower. If this process of knocking down the "excess" percentage (without doing something about pulling up those *below* the general average) were followed long enough, a utility company would end up conceivably with no return at all.

Whether the private line business earnings were actually so far out of line as to require a special reduction is, of course, the heart of the question which the FCC must decide in this case. But in the process there is danger that the commission may go for some new rule of strict conformity with some fictitious "norm" of earnings which could sink below what any regulated utility company needs to keep healthy. This is probably what Mr. Kappel had in mind when he stated:

"Especially in today's economy, as government itself has been urging, every effort should be made to keep companies strong and healthy so they can take new risks, increase productivity, sell more goods, and employ more people.

"The commission's action works against this goal. There is no formula for pushing profits down with one hand and pulling business up with the other. . . .

"We have in America's railroads an alarming example of a regulated industry which has not been allowed to earn adequately.

"The communications industry must not be put in such a position.

"Keeping a business healthy costs the consumers less in the long run that restoring it after it is ailing."

Independent companies are not likely to fare any better, under a principle of absolute conformity of special-class-of-service earnings with over-all system operations; i.e., with all earnings geared to a "general average" rate of return. Indeed, in the matter of total compensation on long-distance business handled between Bell and Independent companies, the application of such a principle could hurt the Independents quite a bit, especially if it resulted in substantial long-distance rate reduc-

tions. Of course general long-distance rates are not before the FCC in this particular case. But with such a mischievous principle bouncing around, who can tell how long it will be before the GSA or somebody else dreams up a complaint for the reduction of interstate long-distance rates?

Admittedly the Bell System return on interstate long-distance rates has been put under pressure, in recent years, to offset deficiencies in a return on intrastate business. State commissions have been very active in seeking formulas, such as the Phoenix plan, for the separation of interstate and intrastate business in rate cases which result in interstate business bearing a greater share of total operating costs as compared with intrastate business.

The Subscriber Could Be Hurt

The fallacy that a lower rate of return for a utility is an automatic guaranty of lower rates, better service, and other protection for the utility customer is all too prevalent in regulatory thinking today. A recent study in *Electrical World* (issue of June 16) of 102 power companies shows that good earnings benefit the customer as well as the stockholder.

This study, incidentally, shows that "fair value" companies with better earnings and other companies having better earning, regardless of where they are located, had lower bills. The basis of this study is the official residential electric bill comparisons published by the Federal Power Commission.

Incidentally for those who might still have some doubts about it, the *Electrical World* analysis shows that "fair value" companies—meaning those utilities operating in states where the commissions use a fair value rate base rather than an original cost rate base —earn higher rates of return than "original cost" companies. This is only to be expected by those who give serious thought to the matter. But occasionally one finds a strict "cost base" zealot who is likely to talk about "stability" and the "long-range effect" of the original cost base as being in the over-all interest of the utility stockholder.

But the *Electrical World* study shows that during 1957 the average rate of return for 38 electric companies in "fair value" jurisdictions was 6.25 per cent. In so-called "original cost" states the average of 65 companies was only 5.43 per cent. Yet, notwithstanding these better earnings in the "fair value" states, the *Electrical World* study shows that average monthly bills of the "fair value" companies cost the customer $7.09 for 250 kilowatthours, as opposed to $7.52 paid by customers in states where the commissions follow the "original cost" formula.

Comparative rate data for telephone companies in various states are not readily available for a similar analysis. Whether telephone companies operating in "fair value" states offer cheaper service than those operating in "original cost" states is a finding which would have to be weighted against the "value of the service" factor, which varies according to the density of population and the extent of common exchange facilities. A $5.00-a-month telephone rate for a subscriber to an exchange with only a few hundred or even a few thousand other subscribers might be quite expensive as compared with a higher monthly bill to a telephone subscriber having access to an exchange serving tens or hundreds of thousands of subscribers.

But aside from these inherent economic differences between telephone and electric utility operations, there is no reason to suspect that the basic comparison of "fair value" earnings with "original cost" earnings is any different. As Mr. Kappel's statement suggests a company with good earnings is generally able to do a better job for its customers than a company with poor earnings.

Mr. Kappel put it this way: "If the earnings of the telephone industry are pushed too low the result can be the crippling of America's communications system. An industry with poor earnings simply does not have the ability to serve its customers, to do the research which leads to better service, nor to carry on an effective part in the defense effort."

All of which suggest that mere limitation of a utility company's property is no automatic guaranty of consumer protection. Economic history in the United States, as well as other countries, is full of examples where it was the customer who suffered in the end from the deficiency of services which unprofitable businesses were unable to perform.

Here are the thought-provoking conclusions contained in the *Electrical World* study applicable to electric companies:

"There appears to be a paradox in the fact that 'fair value' companies with rates of return substantially higher than those in 'original cost' jurisdictions are able to offer their services at rates considerably lower.

"This study makes no attempt to analyze all the other factors which enter into the over-all earnings position of a company. On a spot check, however, it was found that commercial lighting service bills for 750 kw-hr per month with a billed demand of 6 kw were about 2 per cent less for companies in the 'top 25' group compared with the 'bottom 25' group of earners.

"While only good management can initiate better earnings, the continuance of good management is in turn dependent on sustained good earnings. This type of management will be able to operate more economically, less on a piecemeal basis, and with long-range economies in mind.

"In other words, good earnings must result in economies which management is able to pass along to consumers."

"Electronic Eavesdropping"

U. S. Attorney Paul W. Williams for the Southern District of New York thinks that the defenders of civil rights may be going overboard in tying the hands of law enforcement authorities through anti-wire-tap rules and legislation. Most of the movement against the use of evidence obtained in criminal cases by wire tapping has resulted from judicial decisions rather than legislation. If anything, the legislatures, both state and Congress, have been showing some tendency to strengthen the hands of law enforcement authorities in this respect.

Anyhow, Federal Attorney Williams, in a speech delivered at Saranac, N. Y., on June 25, came right out and called for federal and state laws permitting the use of telephone wire taps to break up organized crime syndicates that have become an "invisible government." Williams asked also that "electronic eavesdropping" be legalized to detect espionage, narcotics violations, and extortion. But he warned that legislation also must be passed specifically prohibiting wire taps by private citizens.

Williams made his recommendations in a speech titled: "Should Wiretapping Be Made Liberalized?" at the summer meeting of the New York State Bar Association. "If one examines our present national scene," he said, "one is shocked by the growth of crime—in particular, organized crime. There is little doubt in my mind that organized crime has become a serious threat to this country."

SAGE Operation Explained

Air Force officials have at last disclosed details of the nation's principal shield against enemy air attack—SAGE (see also, in this issue: "SAGE—A Report to the Independents," by Paul F. Radue). The system—which uses the largest electronic computers in the world, each occupying a two-acre area —became operational on June 27. Officials showed the SAGE (semi-automatic ground environment) system direction center for the New York air defense sector at the McGuire Air Force (New Jersey) Base to newsmen for the first time. They said the McGuire base is "one of many intercon-

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SAGE—A Report to the Independents

By PAUL F. RADUE*

IN THE early days after the defeat of Nazi Germany, United States and British intelligence agencies began uncovering proof that the Germans had been further advanced in their military air and missile programs than had been anticipated. It was further learned that the Red Army had swiftly confiscated much of the work previously done by German research organizations and dispatched it—together with many captured German scientists—to the Soviet Union. Our military leaders decided that adequate air defense was essential to our survival.

To protect the civilian population and vital industries of the United States and Canada, it became immediately necessary to provide an improved warning system to detect the approach of unidentified objects from the air, along with means of intercepting such objects. Ultimately, such an air defense system must provide for the interception of high velocity missiles, as well as aircraft.

The existing manual system had a limited capacity and had little prospect of being able to grow and meet the threat of large numbers of attacking aircraft. The development of a highly centralized system based on high speed digital computation to meet these needs was one basis for organizing the Lincoln Laboratory by Massachusetts Institute of Technology in 1951. The initial efforts of this group and others resulted in the present series of air defense systems. Improvements are continually being made to meet changing needs and advances in the development of aircraft and missiles.

A series of air defense projects, each covering a different geographic area of our Northern Hemisphere, was developed. The "White Alice" project (TELEPHONY, Jan. 25 and Apr. 12) provides military and civilian communications in Alaska. The "Dew Line" extends approximately 3,000 miles along the outer periphery of the North American Continent. The "mid-Canada" network extends some 2,700 miles along the 55th parallel and is 760 to 1,500 miles north of our northernmost industrial centers. The "Pine Tree" project follows the 50th parallel which lies roughly along the border between the United States and Canada and extends up into Greenland. Considerable areas of the Atlantic and Pacific Oceans are also under observation by radar equipped aircraft and naval vessels.

Information from all lines will eventually feed into the SAGE system (TELEPHONY, Jan. 21 and 28, 1956), here in the United States, to provide American cities several hours of warning against possible attacks from the air. The system also directs pre-arranged counter-attack measures.

SAGE stands for Semi-Automatic Ground Environment. The heart of the SAGE system is a high speed electronic digital computer. The place where this computer and its associated equipment are installed is called a Direction Center.

The air surveillance information is collected from radars and all other available sources and is sent continuously and automatically to the Direction Center over data transmission circuits. After processing by the computer, the changing air situation is displayed to responsible Air Force personnel who utilize it as a basis for making tactical decisions. Therefore, electronic machines *and* men are used to make this a semi-automatic arrangement, as the name implies.

Much has already been written about the SAGE plans, but little has been said of its technical aspects. This report is primarily concerned with the transmission problems of providing commercial telephone circuits for this military application.

Once the general direction of the projects had been determined and the feasibility of the decision verified, our military forces reviewed the electronic industry for likely organizations which could best assist them in handling the problems at hand. It didn't take long to determine that the Bell System, with its development, engineering, operating and manufacturing facilities, was capable of taking on such a project.

As a point of information, our military services make major purchases of complete systems under what is called the Weapons System Management Procurement Program. In the past, military organizations have obtained equipment from different suppliers according to a contract and specification. Such material was then shipped to a central location, where the military actually

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Summary of SAGE Report to Independents

This report is comprised of: (1) Introduction; (2) The Present Air Surveillance System; (3) How the SAGE System works; (4) Technical Aspects (4a), Bandwidth requirements (4b), DDT's and DDR's (4c), Delay Deviation Limits (4d), Impulse Noise Measuring Technique (4e), Signal Level Requirements (4f), Compandors and Negative Impedance Repeaters (4g), Open Wire (4h), Cable (4i), Radio Systems; (5) Commercial Aspects, and (6) Conclusions.

The purpose of this article is to inform Independent telephone companies that they are capable of participating in the SAGE program.

Advantages from such participation—detailed in this report—include increased revenue in the near future, valuable experience and the improving of plant necessary for meeting the more exacting demands of tomorrow's business customers.

put the individual components together to make up a whole. Since many contractors were frequently involved, components sometimes were not compatible and there were often delays in meeting delivery dates. The military services have found they can conserve both time and money by holding a primary contractor responsible for an end product. Often a prime contractor contributes only a small portion of the end product, but calls on many sub-contractors to share in the job.

In 1953, the Air Force requested the Bell System to augment their capabilities in the timely implementation of the SAGE system. On the basis of this request, the Western Electric Co., the manufacturing arm of the Bell System, came to an agreement with the Air Force to assist them with the engineering, coordination, construction, and testing of the SAGE system.

In line with the current military practice of leasing commercial facilities whenever it is economically attractive, both Bell System and Independent operating telephone companies would be utilized to provide telephone circuits for implementation of the SAGE program.

In general, here is how the military has assigned responsibilities in the Air Defense program:

Research and Development—Lincoln Lab., Massachusetts Institute of Technology.

Electronic Equipment—IBM, Burroughs.

Computer Program—Lincoln Lab., Rand Corp., etc.

Radar and Weapons Additions—Air Force and Corps of Engineers.

Communications—Telephone companies and the communications industry.

Engineering, Coordination, Construction, Testing, etc.—Western Electric Co.

There is nothing particularly unusual about providing channels for data transmission. Many telephone companies are in an excellent position to provide suitable facilities between remote locations for the SAGE program. The basic concept of the SAGE project is to use currently available good-talking circuits. This report involves transmission requirements for carrying data signals over voice bandwidth type telephone circuits. Even though the basic concept of the SAGE project is to use talking circuits currently available, there are certain areas, such as systems engineering and service continuity, where extra attention is required in order to meet conditions peculiar to SAGE. Such care is well within the scope and ability of practically every telephone company.

The valuable information gained through provision of suitable SAGE transmission media in a nationally integrated system will prepare Independents to meet the challenge of tomorrow; namely, high speed data transmission.

Telephone companies are inherently involved in the problems of transmitting bits of information over commercial telephone facilities. Prediction as to the volume of potential information eventually to be handled over commercial communication channels leaves one almost breathless. Some informed people believe that it will someday equal the volume of toll business.

Present Air Surveillance System

Under the present manual air surveillance system, information gained at each radar installation is reported verbally to a central or control location. Such information is then plotted on the reverse side of a large transparent plotting board by personnel trained to write backwards. The space behind these boards and the ability of individuals to handle many radar reportings is limited. Thus, the number of radar sites that can be handled is also limited.

The most serious aspect of this manual system is the critical loss of time in its operation. With present-day aircraft traveling above the speed of sound, an enemy bomber or missile might complete its mission before it could be located and intercepted. It has, therefore, been found necessary to provide automatic—and nearly instantaneous—means of reporting "radar sightings" from various locations to a central location.

How SAGE Works

It will be well to explain exactly what is transmitted under the SAGE plan, so that one may better understand why certain conservative transmission engineering standards are necessary. Radar units located at strategic points determine the azimuth, distance and elevation of objects in the sky. Azimuth is determined by the physical position of the transmitting and receiving antenna at the time a pulse of energy is sent out and a reflection of that pulse has been received. The distance is determined by noting the difference between the time a pulse leaves and when its reflection is received. The velocity of a radar signal is known to be that of light, which is about 186,000 miles per second.

Normally, this information is plotted on what is known as a radar scope. Since each radar search area is limited, there is a distinct advantage in consolidating information from various

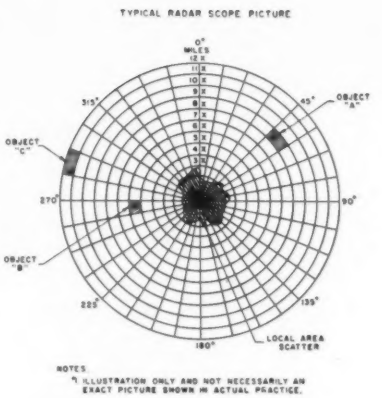

Fig. 1

radar sites into a composite picture at central locations. This involves transmitting information from a radar site to locations some distance away.

The radar scope is frequently remote from the transceiver, usually a distance of less than a mile. Information and synchronizing pulses carried between the scope and transceiver contain frequency components up to 2 to 3 mc and require special ties. The commercial channels furnished by telephone companies are limited to a band approximately between 200 and 3,000 cycles per second. Therefore, a new technique is required when attempting to squeeze a 2-3 mc band into a 3 kc band. The following paragraphs outline briefly how only the essential information is transmitted over the line.

A typical radar scope picture is illustrated by *Fig. 1*. The heavy dots represent radar sightings when the scope is located near the radar unit where high quality (full band width) tie lines can be used. Let us visualize that the scope has been relocated to a distant point and that the sightings now must be transmitted over a narrow band facility, such as a telephone carrier circuit. The information must then be sampled, converted and made suitable for transmission over toll facilities, reconverted, and fed into a computer. The computer plots the information on a master scope, but with somewhat less definition. This is indicated in *Fig. 1* by lined areas.

Technical Aspects

Bandwidth Requirements. Since a dc signal cannot be transmitted directly over most telephone channels, a carrier frequency is needed. By a means beyond the scope of this article, information normally available on a radar scope is broken into minute segments in azimuth and range which are sampled, converted into a composite signal, and transmitted over voice frequency

channels using the frequency spectrum shown in *Fig. 3*.

According to the work done by Nyquist and his associates, any abrupt information such as on-off signals transmitted over a single or double sideband facility incur in-phase, out-of-phase and quadrature components which result in distortion of received envelope under ordinary conditions. Due to such distortions, additional band width may be required. The amount of intelligence that can be transmitted satisfactorily is primarily a function of information speed, signal-to-noise ratio and carrier frequency.

For various reasons beyond the scope of this article, it all boils down to changing the three sine wave signals (synchronizing, timing and data) received from the SAGE system data source, converting such signals into a three level square wave composite signal, as represented by *Fig. 2*. This signal modulates a 2,000-cycle carrier which is then transmitted over commercial telephone facilities. At the distant end, the reverse process delivers essentially the same signals (synchronizing, timing and data) originally accepted.

DDT'S and DDR's. The lower sideband of the modulated 2,000 cps carrier, along with a small portion of the upper sideband, is ideally transmitted, as shown in *Fig. 3*. *Fig. 2* is made up of a 2,000-cycle carrier with a start pulse amplitude modulated for peak voltage value four times its normal level, with subsequent bits of information indicated by a relative amplitude of 0.63 times that of the start pulse. The carrier is always present at 0.25 times the amplitude of the sync pulse. The digital data transmitter unit provides the 2,000-cycle carrier on which the dipulses are modulated *(Fig. 2)*.

A series of bits makes up a message and lies between a series of synchronizing intervals somewhat similar to a teletype signal. Each bit is 625 microseconds in duration for a 1,600 bit system and 770 microseconds in duration for a 1,300 bit/sec system.

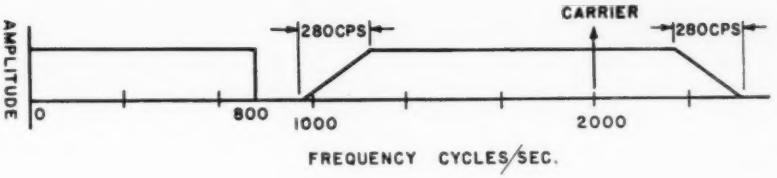

Fig. 3

The DDT, which is a part of the leased telephone service, accepts signals from the military radar unit and converts them to a form suitable for transmittal between remote points on leased telephone circuits. After transmission over the telephone line, the data signals are returned to military via digital data receivers, DDR's, which regenerate them to the original form. Most data transmission is unilateral in nature, and only one direction of a "four-wire" circuit is required. However, in order to retain flexibility, for restoration of service by reassignment for example, the opposite direction of transmission is retained. It would be impractical to eliminate one direction of a carrier channel and certain other facilities. Four-wire operation has a distinct advantage in reducing noise and other interference, particularly that relating to run-around paths existing in two-wire, two-way circuits.

Delay Deviation Limits

Delay distortion across the talking circuit between about 1,000 cps and 2,500 cps must be considered. Delay distortion is caused by a difference in velocity of propagation between different frequencies transmitted over a band of frequencies. Correction for delay distortion is necessary to avoid one bit being represented falsely as another bit of information making up a message. Delay measurements are costly to make in the field; however, a relatively simple means for providing delay distortion correction is accomplished on a prescription basis. Such a practice assumes that the facility being considered is actually within design limits and has proper impedance characteristics. This point cannot be stressed often enough.

Envelope delay distortion is limited to a maximum of 500 microseconds in the facilities between the DDT and DDR units over the frequency spectrum between 1,000 and 2,500 cycles per second. This is delay *deviation* (from nominal), and not actual delay. Delay equalization may be either lumped at the DDR end or individual sections can be equalized.

Impulse Noise Measuring Technique

In general, the average human ear is not sensitive to noises of an impulse nature when less than about 200 milliseconds in duration. The Type 2B Noise Measuring Set (or equivalent) has been designed to simulate the response of the human ear both as to frequency weighting and response time. Accordingly, the indicating meter has a time constant of 200 milliseconds. Since this time delay is considerably greater than the duration of impulse noise, we are concerned about the average power—not the peak impulse values—and that is what is measured. The SAGE data receiver, however, is sensitive to any pulse with sufficient amplitude existing at sampling time. Therefore, other means need to be used for making impulse noise measurements.

A relatively simple, but time consuming, method is being used tentatively in order to determine the adequacy of a facility for SAGE transmission from an impulse noise standpoint. This procedure consists of measuring the momentary peak voltage of the noise pulse with an oscilloscope or by some other fast operating meter. The bandwidth being measured must necessarily be restricted to that of concern by the characteristic of the facilities being measured or by a filter. An opaque ½" x 1½" sticker is used on the oscilloscope as a reference. The oscilloscope is then connected to the facility under test and the vertical gain adjusted so that only occasional noise bursts (three or four per minute) extend beyond the mask.

Following this, note the maximum amplitude of any noise burst above or

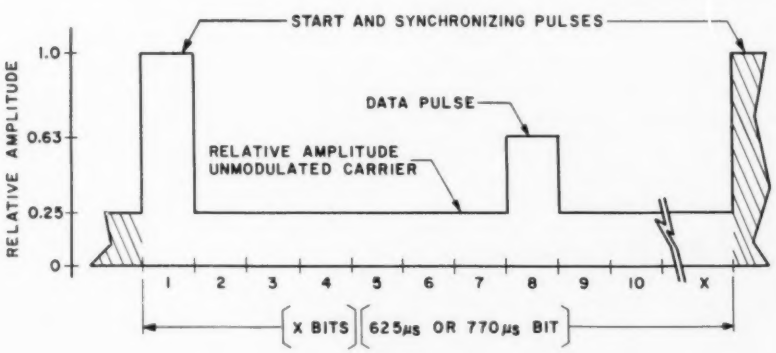

Fig. 2

below the mask during a five-minute period (though a much longer period of observation is preferred). A signal from an oscillator of equal level to that of the maximum burst noted and calibrated with a db meter is then a measure of the relative impulse noise level for that facility. This measured value must be at least 18 db below the average data signal level of —1.5 db (with respect to a standard zero dbm reference level).

We understand another method for limiting bandwidth of a measuring circuit is to place the oscilloscope or fast response meter at the output of a 2B noise measuring set adjusted for 144 weighting. The relationship between the measured noise and the error that may be expected to result depends, of course, upon the transmitted signal level and the susceptivity of the DDR.

With the Bell System DDR incorporating the features that are standardized as of Jan. 1, 1958, it is expected the error rate will be acceptable if no more than 30 noise pulses exceed —24 dbm during a 30-minute period when measured as outlined above. This assumes the data start pulse transmitting level is 0 dbm at 0 dbm transmission level. The half hour observing period is necessary to obtain reliable measure of the resulting error rate. There is no reliable relationship between Type 2B noise measuring set meter readings and the number of impulses we can expect.

Frequently, there is a wide variation between impulse noise values measured at different times during the day or night. This is due to the fact that noise is generated during telephone traffic busy-hour periods, under atmospheric static and/or weather conditions.

The noise objective specified herein applies specifically to SAGE data signals. However, it is expected that it will also satisfy the requirements of equivalent type data signals transmitted at rates well above 200 bits/sec/channel. In comparison, 100 wpm telegraphic signals transmit at only 74 bits/sec. Therefore, present carrier telephone systems should be designed to meet future needs wherever practical.

Noises of less than 200 microseconds duration are of little consequence to a normal telephone conversation. However, high speed data signals are subject to interference by almost any noise pulse of very short duration occurring at gating interval provided the amplitude is sufficiently great. Therefore, it is necessary to resolve this difference into practical terms.

Signal Level Requirements

The acceptable 1,000-cycle net loss is 6-8 db between DDT and DDR unit. This is no hardship, as most carrier systems operate on a 23 db net gain (—16 dbm input to +7 dbm output) on a four-wire basis.

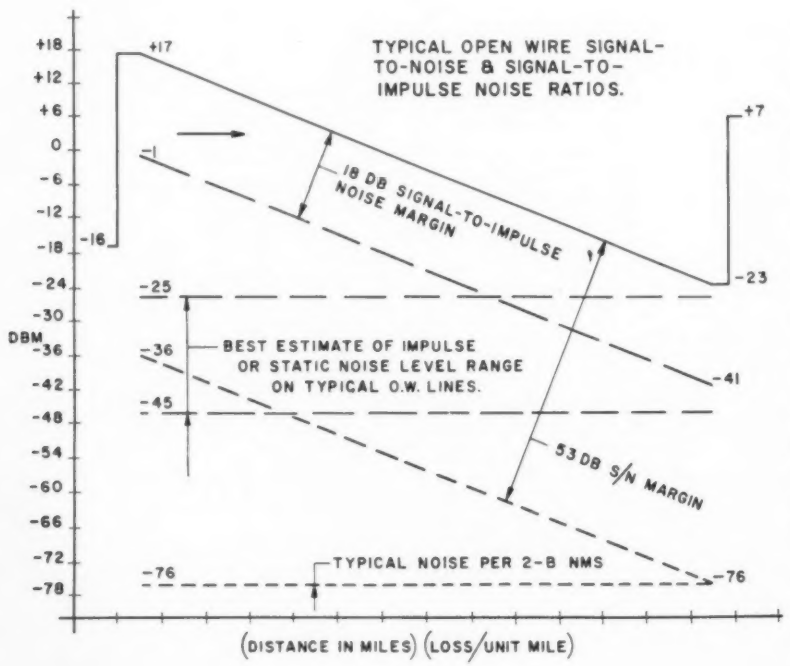

Fig. 4

Compandors and Negative Impedance Repeaters

The signal holds the expandor open continuously, making compandors not effective in noise reduction. Compandors, being inherently non-linear in nature during the time effective gain or loss changes, introduce distortion which is undesirable. Depending upon the distribution of mark and space bits transmitted during each message, the signal level may vary 8 db in about 0.2 seconds.

Negative impedance type repeaters are basically bi-directional in nature. Data signals are transmitted in one direction only. Gain is realized by providing phase shift characteristics opposite to that of the facility, thereby realizing apparent gain. Resulting impedance variations with frequency and level result in a varying phase delay problem not easily resolved. Therefore, negative impedance repeaters are to be avoided for data circuits.

Level stability of ±1 db is adequate when the changes are of a gradual nature. Rapid changes greater than ±0.1 db within a four-second period cannot be tolerated. This means, of course, regulated carrier channels. Very short physical facilities fall within this limit.

Open Wire

Carrier levels and repeater spacings have been tightened for SAGE requirements. The F1A plus telephotograph weighted noise level should not exceed 40 db (formerly 30 db) below the start signal level. The number of impulse noise peaks which exceed 18 db below the start signal level should not exceed one per minute. Exactly what does this mean? Normally, signal-to-noise ratio on a talking circuit represents the level of noise below that for a relative talking level, commonly referred to as 0 dbm 1,000-cycle signal at the testboard. That is, using a Type 2B noise measuring set, or equivalent, a 9 dba value (idealized) may be read when measuring an open wire lead. When a carrier telephone system transmits a +17 dbm, our signal-to-noise ratio starts out as 93 db (85—9+17); however, at the receiving end the noise level may be the same—but let us assume the reference signal level for a 3 kc carrier channel band has dropped to —23 dbm. This means that the signal-to-noise ratio is now 53 db (85—9—23) and still considered to be of "tool quality."

So far we have been talking about signal-to-noise as read on a Type 2B noise measuring set, or equivalent, and have not distinguished impulse noise from "white," "thermal" or other long duration sources of noises. *Fig. 4*

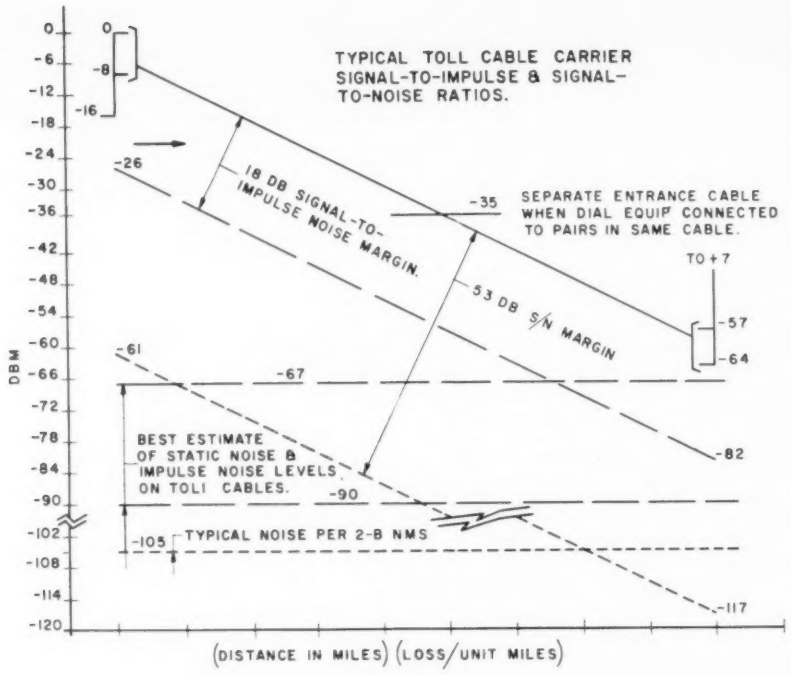

Fig. 5

shows the relative difference in levels between the two types of noises of primary concern.

The best estimate of static or impulse noise level likely to be experienced on an average pair of open wire lines transposed for applicable frequency range is estimated to be —45 db to —25 db in any 3 kc portion of the transmission frequency spectrum. This infers that carrier levels should not go below —7 dbm (25—18) when static noise on an average pair is found to be —25 dbm, as indicated in *Fig. 4*. Remember, this covers wires transposed for the highest frequency being transmitted on that particular line. Since many of the high frequency systems are on 30 kc transposed lines, the minimum equivalent carrier channel level should not be permitted to fall below —1 dbm during wet weather conditions.

This can be modified somewhat depending upon the part of the country in which a proposed carrier will be operating. Since these figures are best current estimates only, some telephone companies are engineering a normal system on a conservative basis, with the intention of adding a repeater temporarily to improve the signal-to-noise ratio if it should become necessary. This is sound engineering, as most "high transmitting level" type systems require about one-half as long a repeater section to meet SAGE requirements during adverse weather conditions.

Fig. 4 shows data transmission considerations plotted for a high level carrier telephone system. For carriers transmitting at lower levels, move all diagonal lines down by the amount equivalent to the difference in transmitting levels. This represents the 40 to 150 kc type carrier system. For other frequency ranges, the diagonal slopes need to be changed to agree with a particular band under study.

Cable

Noise mitigating measures directed at controlling impulse noises on cable carrier systems include: (1) Adding longitudinal suppression coils to all open-wire or drop-wire taps that cannot be avoided coming out of a cable; (2) adding longitudinal suppression coils to all cable pairs including those on which a carrier system is working, especially where either artificial line or span pads are used; (3) shortening repeater sections. Also, it will be necessary to apply noise suppression to all grounded dc telegraph facilities, extend lead covered or shielded cable to carrier bays, and keep clear of other cables carrying regular telephone lines by at least 4 inches. Carrier below —35 dbm should enter offices in a cable not carrying pairs connected to dial equipment.

A typical clean cable carrier message circuit noise level usually varies between —105 and —120 dbm at the input to the receiving terminal. It has been estimated that LGR or HGR terminals or LH repeater impulse noise levels range between —67 dbm and —87 dbm with HL repeater impulse noise levels between —64 dbm and —84 dbm when a carrier is transmitted—again measured at the input to the receiving terminal. A single sideband suppressed carrier cable system having higher sideband carrier levels has an improvement of about 9 db (see *Fig. 5*).

Many cable pairs normally suitable for toll purposes, transmissionwise, may be found to have impulse noise values too great to be suitable for SAGE purposes. Although pairs may sound very quiet—and may measure that way on the Type 2B noise measuring set or equivalent—there may be a surprising amount of short duration high amplitude impulse noises present.

A well designed and properly installed cable, clean all the way and for toll purposes only, provides very suitable SAGE transmission characteristics. Loaded cable requires considerable delay equalization. For this reason, 19 ga. H-88 cable may not exceed 200 miles in any SAGE circuit.

Radio Systems

Properly and conservatively engineered radio systems have been found most suitable for SAGE transmissions. The greatest majority of radio links installed by commercial telephone companies fall in this category. The suitability of radio systems for military application is strongly attested to by the number of such systems installed and operating solely for that purpose. It is noted, however, that such systems *are* engineered conservatively and in the best tradition of progressive commercial telephone companies.

Radio paths that are well within the basic design characteristics of a particular system should present no serious path nor maintenance problems. Systems approaching the maximum capabilities of a radio system should always be engineered by personnel experienced in radio systems applications.

Reports on some radio path problems show that their existence is primarily due to over extending path length. By over-extending, we refer to attempts at using longer distance radio repeaters without increasing antenna and/or reflector size and rigidity, power output, receiver sensitivity, proper Fresnel zone clearance, over estimating frequency or space diversity advantages and other factors too numerous to mention here.

Even after conservative engineering on the basis of the best knowledge available, certain path transmission problems remain for which no economical solution exists. Frequency diversity, or quasi-switching used on heavy multichannel radio systems, provides a

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THE Plant Man's Notebook

BY RAY BLAIN, TECHNICAL EDITORIAL DIRECTOR

THE WRITER HAS just completed a trip from Washington, D. C., to San Francisco, Cal., returning via air on a United DC-7. On the trip out, we stopped in Denver while the return flight was non-stop. Of a total of 34 coast-to-coast flights, this one was the first non-stop, and it proved most enjoyable. We landed in San Francisco at 9 p.m. on a clear night. This city and the bay area at twilight —from the air—present a beautiful picture.

We have always enjoyed our numerous visits to San Francisco. In our opinion, it is one of the most beautiful and cleanest cities in the world. Even the fire plugs are painted white. The buildings always appear to be freshly painted, and the streets and sidewalks always have a well scrubbed look. The flowers and shrubbery are lush.

On previous trips to this city we have always carried a rain coat and made use of it frequently. This time we carried one as usual, but did not have need for it. The weather proved beautiful during the entire week of our stay and the native sons maintained that this was not unusual.

There is one thing in San Francisco, however, that does not differ from other cities, and this is their pigeon problem. These birds all possess the same obnoxious habits whether they are in Philadelphia or San Francisco.

We have always found the restaurants in San Francisco to be well above the average found elsewhere. We make it a practice to have at least one meal at Bernstein's Fish Grotto, the ship that never goes to sea. We also dined at the Dominio Club where the food is excellent and the art exhibits even better.

As usual, we rode the Powell Street cable car out to Fisherman's Wharf, a tourist attraction, but also famous for good food. Riding the old cable cars is in itself a great experience, and the passengers usually help the crew turn the car at the end of the line on the hand-operated turntable.

The motorman on these little cars should never suffer from the lack of exercise. A long-handled lever, actuated by the motorman, grips the cable that runs continuously in a slot in the street. Then, when traveling down hill, a hand-operated brake requires considerable physical exertion on the part of the motorman to maintain a controlled speed.

"Chinatown" is also a worth-while tourist attraction and we enjoyed an excellent meal in one of their many restaurants. Their novelty shops are not well stocked at the present time due to the Iron Curtain preventing them from receiving shipments out of Red China. We discussed this with some of the shopkeepers and they indicated that they would not handle products of Red China even if permitted to do so.

In our opinion, however, Chinatown has lost much of its glamour since the time we first visited there in the early twenties. The present inhabitants were practically all born in this country and think and act about the same as we do.

Some customs on the West Coast are noticeably different from the Middle West and the eastern sections of the United States. For example, some liquor stores have free ice cubes for their customers. Insulated bags are available and you help yourself from a large freezer. Milk is delivered to restaurants in one to five-gallon cans instead of bottles.

Because of the steep hills, there is a city ordinance requiring the front car-wheels to be cut into the curb when parking to prevent runaways. The car must also be left in gear and the brakes set. Failure to comply with these rules will get you a ticket. Some sidewalks are so steep that walking up or down by an untrained pedestrian proves extremely difficult.

One tourist attraction we never miss when visiting San Francisco is a trip to the "Top of the Mark." Refreshments from the restaurant located on this lofty tower always prove enjoyable. The ideal location of the Mark Hopkins Hotel affords a panoramic view of all San Francisco that will long be remembered. The night view with the lighted Golden Gate and Oakland bridges is always a most beautiful sight.

We had a most enjoyable and profitable time conferring with the communicators of the Signal Office of the Sixth Army at the Presidio of San Francisco. We also made a trip by auto to the U. S. Army ACAN Transmitting and Primary Communication Station near Davis, Cal. This station switches teletypewriter messages automatically and, in our opinion, is one of the outstanding developments of this age of communications.

We also visited an unattended microwave repeater station on top of Mount Vaca. The emergency power arrangement used here is new to us, but appears to be the answer for all installations where even momentary power failures may prove detrimental to an important communication system.

The commercial power operates a motor-generator set to power the station. A 110 volt dc motor is direct connected to the drive shaft of the M-G set and revolves with it. In the event of a power failure a 110 volt storage battery picks up the load on the dc motor and continues to power the revolving M-G set.

Batteries and the dc motor carry the load for two minutes while a gas-engine-operated generator starts automatically and gets up to the speed

(Please turn to page 48)

No. 1 of a series...

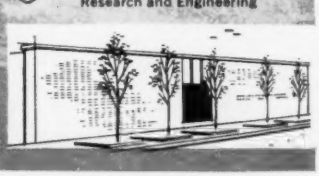
the dead-ends you never see improve the ones you buy

RESEARCH & ENGINEERING TEST SAMPLE
TYPE OF TEST Corrosion
EQUIPMENT USED Salt Fog Chamber
SPECIMEN NO. 10
TEST STARTED 3/24/58 9 a.m.
TEST TERMINATED 5/23/58 2 p.m.

Most metallurgists and product design engineers are aware that laboratory corrosion tests have relatively little quantitative significance in terms of predictable service life. The only valid conclusion which may be drawn from such tests is that the particular samples tested had a certain relative resistance to the specific corrosive environment in which they were placed.

Nevertheless, corrosion proof-testing is considered an essential phase of product quality control at the Preformed Research and Engineering Center. In addition to conventional raw material quality control procedures, observations of relative corrosion rates are also made on finished products. As an example of objective performance standards used, Preformed Guy-Grip dead-ends are required to have corrosion resistance exceeding that of the strand for which they are designed. To assure compliance with these minimum quality standards, samples taken routinely from production are applied to strand specimens and exposed to a severe corrosive environment under closely controlled laboratory conditions. Periodic inspections are also made of field test specimens installed at locations throughout the country which are considered to be representative of extreme marine and industrial contamination. This constant laboratory and field surveillance has undoubtedly been largely responsible for the fact that there has never been a report of a Preformed Guy-Grip dead-end having failed in field service due to corrosion.

Jon R. Ruhlman, Vice President
Research and Engineering



Research and Engineering ... another reason why ...

You can look up to **Preformed**

PREFORMED LINE PRODUCTS COMPANY • 5349 St. Clair Avenue, Cleveland 3, Ohio. Cable: Preformed-Cleveland ... manufacturer of armor rods, dead-ends, Guy-Grip dead-ends and other line accessories.

* Made in accordance with or for use under Patent No. 2,761,273; other patents issued and pending.

USE of 2-5 Number Manuscript One Year Prior to Cut-Over

R. G. DODD

By RALPH G. DODD*

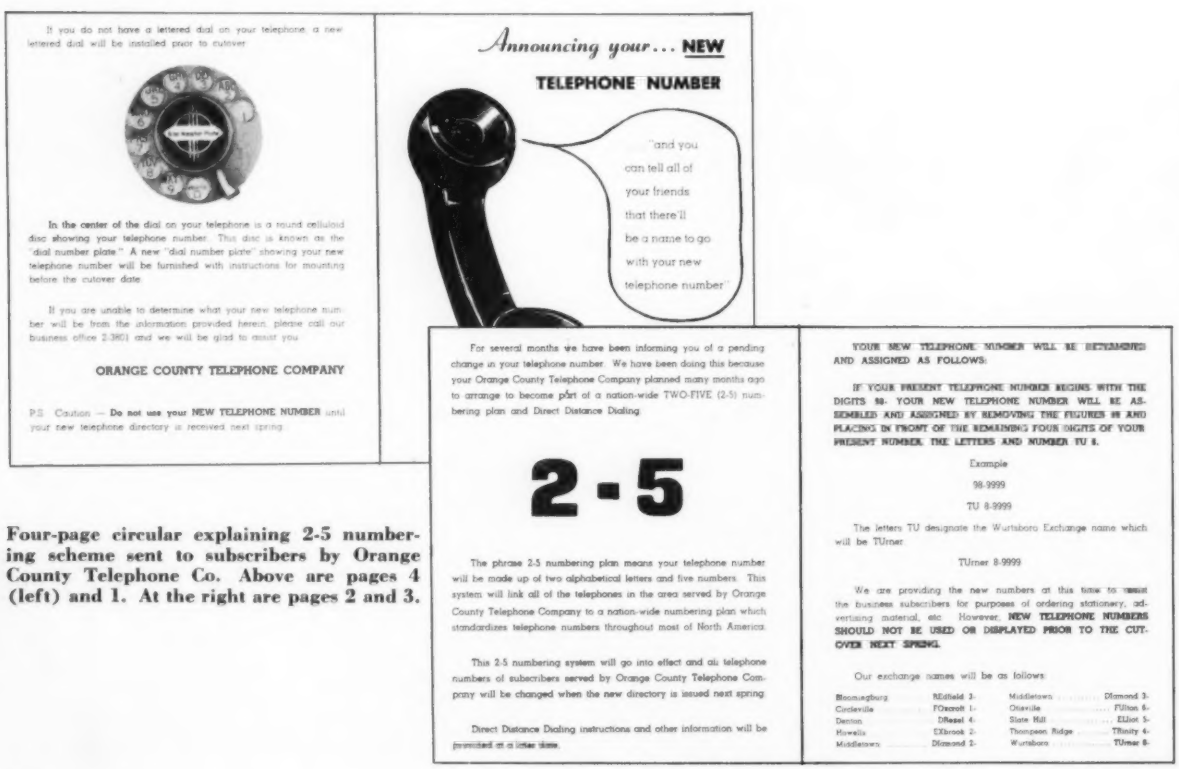
THE ORANGE County Telephone Co. of Middletown, N. Y., an Independent serving an area of approximately 240 square miles in parts of Orange and Sullivan counties in lower New York State, recently completed a unique experiment in planning, educating, and handling a 2-5 cut-over. Its plans included the use of a working 2-5 directory manuscript for a period of almost one year prior to the 2-5 conversion.

Approximately two years before the conversion took place, plans were formulated which included preparation for space and building requirements, type of equipment to be used, equipment delivery schedules, education for subscribers, timing of convention events, directory publication, and other matters, in order to insure a systematic way to bring about a successful conversion without undue confusion and last-minute problems.

One of the unique phases of the company's planning was the system and timing of announcements to subscribers regarding telephone number changes.

First announcements to subscribers took place during the Fall of 1956, 18 months before the cut-over date. Subscribers were informed by radio, newspaper and monthly bill inserts that all telephone numbers would be changed during 1958. In October 1957, subscribers served by the company were

*Mr. Dodd is Commercial Manager of the Orange County Telephone Co. of Middletown, N. Y.



If you do not have a lettered dial on your telephone, a new lettered dial will be installed prior to cutover.

In the center of the dial on your telephone is a round celluloid disc showing your telephone number. This disc is known as the "dial number plate." A new "dial number plate" showing your new telephone number will be furnished with instructions for mounting before the cutover date.

If you are unable to determine what your new telephone number will be from the information provided herein, please call our business office 2-3801 and we will be glad to assist you.

ORANGE COUNTY TELEPHONE COMPANY

P.S. Caution — Do not use your NEW TELEPHONE NUMBER until your new telephone directory is received next spring.

Announcing your... **NEW**

TELEPHONE NUMBER

"and you can tell all of your friends that there'll be a name to go with your new telephone number."

For several months we have been informing you of a pending change in your telephone number. We have been doing this because your Orange County Telephone Company planned many months ago to arrange to become part of a nation-wide TWO-FIVE (2-5) numbering plan and Direct Distance Dialing.

2-5

The phrase 2-5 numbering plan means your telephone number will be made up of two alphabetical letters and five numbers. This system will link all of the telephones in the area served by Orange County Telephone Company to a nation-wide numbering plan which standardizes telephone numbers throughout most of North America.

This 2-5 numbering system will go into effect and all telephone numbers of subscribers served by Orange County Telephone Company will be changed when the new directory is issued next spring.

Direct Distance Dialing instructions and other information will be provided at a later time.

YOUR NEW TELEPHONE NUMBER WILL BE DETERMINED AND ASSIGNED AS FOLLOWS:

IF YOUR PRESENT TELEPHONE NUMBER BEGINS WITH THE DIGITS 98, YOUR NEW TELEPHONE NUMBER WILL BE ASSEMBLED AND ASSIGNED BY REMOVING THE FIGURES 98 AND PLACING IN FRONT OF THE REMAINING FOUR DIGITS OF YOUR PRESENT NUMBER, THE LETTERS AND NUMBER TU 8.

Example

98-9999

TU 8-9999

The letters TU designate the Wurtsboro Exchange name which will be TUrner.

TUrner 8-9999

We are providing the new numbers at this time to assist the business subscribers for purposes of ordering stationery, advertising material, etc. However, NEW TELEPHONE NUMBERS SHOULD NOT BE USED OR DISPLAYED PRIOR TO THE CUTOVER NEXT SPRING.

Our exchange names will be as follows:

Bloomingburg	REdfield 3-	Middletown	Dimond 3-
Circleville	FOxcroft 1-	Otisville	FUlton 6-
Denton	DRexel 4-	Slate Hill	Elliot 5-
Howells	EXbrook 2-	Thompson Ridge	TRinity 4-
Middletown	Dimond 2-	Wurtsboro	TUrner 8-

Four-page circular explaining 2-5 numbering scheme sent to subscribers by Orange County Telephone Co. Above are pages 4 (left) and 1. At the right are pages 2 and 3.

provided with their new 2-letter and 5-digit numbers.

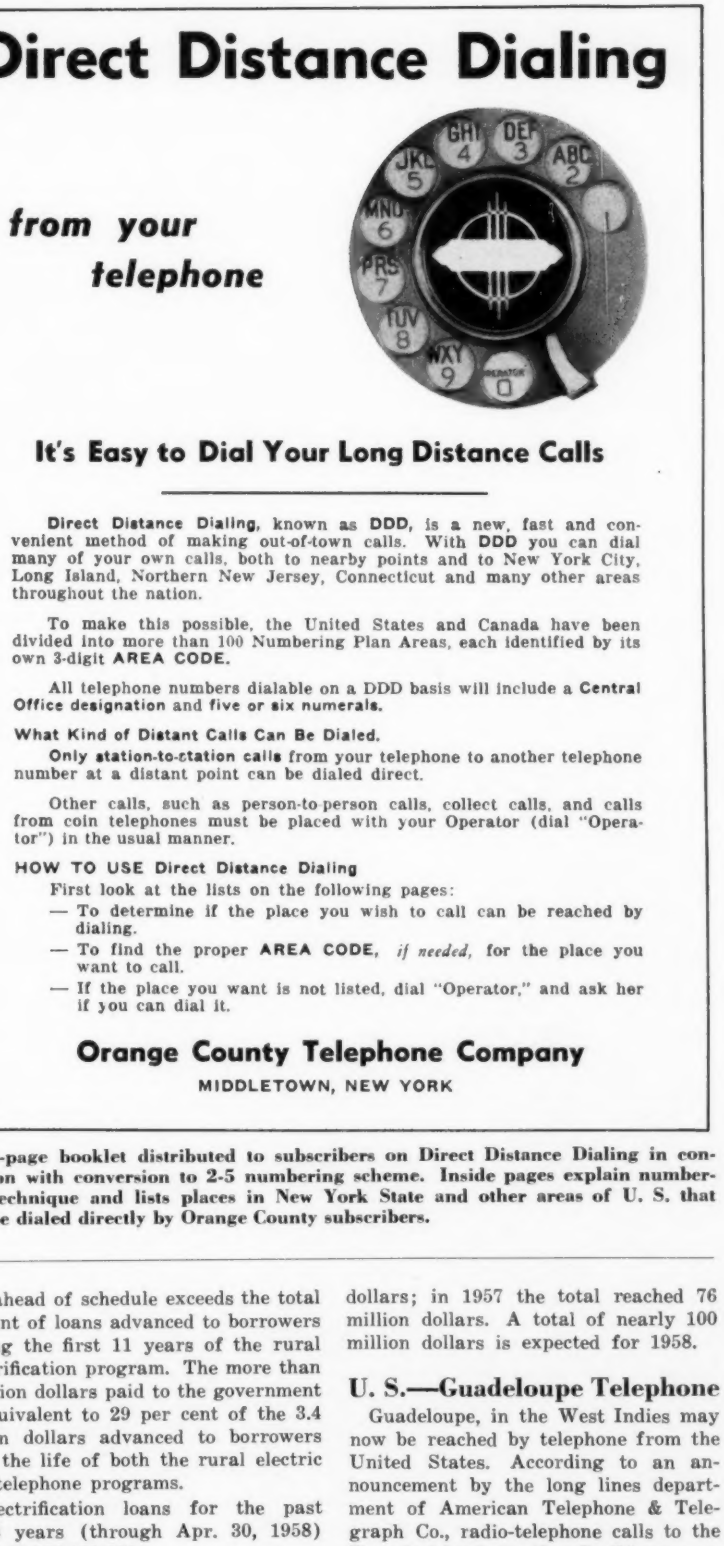
Because of these early and frequent announcements, many problems, unnecessary inquiries and undue concern about the new numbers, on the part of the subscribers, were eliminated. By conversion time, the number change was an accepted fact, and to some degree subscribers anxiously looked forward to the change and felt that they were directly a part of the program and the change.

Plans to eliminate converting the telephone directory simultaneously with the annual closing of the directory for publication were also accomplished.

The Orange County Telephone Co. operates its own directory department and arranges for printing through the New York Telephone Co. Immediate arrangements were made with the New York Telephone Co. to convert the Orange County Telephone Co. directory manuscript to the 2-5 numbering plan. By May 10, 1957, all work had been completed and the Orange County company started to use a 2-5 directory manuscript while subscribers were operating with their old numbers. During this period of time, telephone records were also maintained, using the old telephone numbers.

By so doing, however, the directory and commercial departments became familiar with the new number assignments for almost one year prior to the conversion. In addition to this, the closing of the new directory in January, 1958 became just another routine operation. The directory and commercial departments were not confronted with a directory closing and all of its ramifications, with a 2-5 directory conversion at the same time.

The results of their experiment were most successful and by cut-over time in March 1958, the use of the new number assignments and exchange names were just an old story because all concerned at this time were completely familiar with the operation.



Direct Distance Dialing

from your telephone

It's Easy to Dial Your Long Distance Calls

Direct Distance Dialing, known as **DDD,** is a new, fast and convenient method of making out-of-town calls. With **DDD** you can dial many of your own calls, both to nearby points and to New York City, Long Island, Northern New Jersey, Connecticut and many other areas throughout the nation.

To make this possible, the United States and Canada have been divided into more than 100 Numbering Plan Areas, each identified by its own 3-digit **AREA CODE.**

All telephone numbers dialable on a DDD basis will include a **Central Office designation** and **five or six numerals.**

What Kind of Distant Calls Can Be Dialed.

Only station-to-station calls from your telephone to another telephone number at a distant point can be dialed direct.

Other calls, such as person-to-person calls, collect calls, and calls from coin telephones must be placed with your Operator (dial "Operator") in the usual manner.

HOW TO USE Direct Distance Dialing

First look at the lists on the following pages:

— To determine if the place you wish to call can be reached by dialing.

— To find the proper **AREA CODE,** *if needed,* for the place you want to call.

— If the place you want is not listed, dial "Operator," and ask her if you can dial it.

Orange County Telephone Company

MIDDLETOWN, NEW YORK

Eight-page booklet distributed to subscribers on Direct Distance Dialing in connection with conversion to 2-5 numbering scheme. Inside pages explain numbering technique and lists places in New York State and other areas of U. S. that can be dialed directly by Orange County subscribers.

REA Borrowers Repay Over One Billion Dollars

Total payments to the federal government by Rural Electrification Administration electric and telephone borrowers reached $1,002,267,186 on June 1, the U. S. Department of Agriculture announced on June 24.

This figure includes $545,694,222 repaid by the borrowers on the principal of their loan obligations, $329,493,597 paid in interest, and $127,079,367 paid in advance of due dates.

The $672,800,000 paid on principal and ahead of schedule exceeds the total amount of loans advanced to borrowers during the first 11 years of the rural electrification program. The more than 1 billion dollars paid to the government is equivalent to 29 per cent of the 3.4 billion dollars advanced to borrowers over the life of both the rural electric and telephone programs.

Electrification loans for the past 5-1/3 years (through Apr. 30, 1958) total $1,072,000,000.

During the past five years, the rural telephone program has grown as follows: in 1953, loans totaled 50 million dollars; in 1957 the total reached 76 million dollars. A total of nearly 100 million dollars is expected for 1958.

U. S.—Guadeloupe Telephone

Guadeloupe, in the West Indies may now be reached by telephone from the United States. According to an announcement by the long lines department of American Telephone & Telegraph Co., radio-telephone calls to the French island in the Caribbean, are routed via Martinique. The rate for a three-minute call from New York, exclusive of tax, is $9.00.

TELEPHONY'S Traffic Engineering Handbook

By Gilbert R. Brackett

July 5, 1958

Section 19 (Continued)
Managing Peak Holiday Traffic—Toll

In so far as the OTC operator is completely responsible for the advancement of a call, she should make repeat attempts to secure a circuit at reasonable intervals but not more often than every five minutes. Whenever possible repeat attempts should be kept at a minimum as a part of overload control measures, if sender delays or slow inward answers are met with.

At toll dialing offices OTC operators should attempt to complete calls by dialing through to the farthest limits possible, by following the routing directions. That is, the operator should not attempt to reach an intermediate office for assistance in getting a circuit which can be dialed, nor should she try to reach an inward operator at the TTC for a telephone number which can be dialed.

To prepare for the holiday traffic, estimates of expected traffic should be made far enough in advance to care for needed forces, training, circuit and switchboard arrangements. Early estimates should be checked and, if necessary, revised from time to time. The final estimate should be fully completed about one month before the holiday.

Judgment comes into its own when forecasting holiday traffic, especially when allowing for unusual circumstances and for local conditions. Cutovers, changes in arrangements for handling traffic and the extension of toll dialing should be considered.

Christmas traffic as compared with business day traffic will show quite a difference. Therefore, a special estimate of average units per call should be useful.

While it probably would not be a good idea to instigate special holiday counts in all offices each year, peg counts in a few representative offices could be studied. Over a period of time the relationship of units per Christmas calls to units per business day calls could be developed, and then applied generally in other offices where conditions are known to be similar.

Force estimates should be arrived at as early as possible so that sufficient time will be allowed to assign schedules and carry out training programs. When estimating force needs, each force group should be determined separately.

The number of people required should be based on judgment backed by previous experience. Log records, speed of answer results and force data for the previous holiday will be helpful.

Force adjustment estimates call for careful analysis. To underestimate the force needs might lead to poor service, loss of revenue and bring about unfavorable customer reaction. Where factual data on which to base units per call does not exist, it would be well to keep in mind that holiday work time per call is much higher than under normal conditions.

Increased force could be required for through switching and messenger work. There might be an increase in requirements for auxiliary forces, for rate, route and directory work, delay quoting, handling delayed tickets and keeping callers informed regarding the status of delayed calls. Supervisory force will also need to be augmented.

Satisfactory recording answers are essential on calls which are not affected by circuit congestion. Slow service at inward and through boards results in inefficient use of circuit and operator time and it is often far reaching in its affects on service.

Here slow answers could nullify the most careful plans instituted at other cities to care for the holiday load. The maintaining of speedy inward and through answers is a must if overall holiday plans are to succeed.

TX requirement estimates should be premised on anticipated conditions, keeping in mind the most likely groups to be affected by posted delays, and the probable number of delayed calls that will depend on these circuit groups. This calls for knowledge of previous holiday conditions in the particular toll office, and the characteristics of the traffic that will flow over the circuit groups.

Delays should be posted when originating traffic to a specific point, or over a particular group of circuits, is backed up for 20 minutes or more and promises to increase.

AG reports should be handled quickly enough to meet customer expectations in order to forestall further inquiries and discourage refiling. Even so, operators handling AG requests should deal tactfully with the customer.

When the call number is furnished, valuable circuit time is saved. Calls to points reached over congested circuit groups should receive prompt directory handling. Should a holiday call be filed at an advanced date, the called number along with the routing information should be obtained and entered on the ticket before the busy period begins.

Because of the service situation experienced during a holiday, criticisms should receive special attention. In the large offices it would not be amiss to assign qualified management personnel to handle complaints.

Calling back customers after the holiday, whose calls were not completed because of delays and on which cancellation instructions were not received, to express regret and to offer further attempt to complete the calls, offers a real opportunity to further good will.

(Section 19 will be continued next week)

Missouri and Kansas Associations Hold Seventh Joint Meeting

By Dan S. Fargo

THE SEVENTH annual joint convention of the Missouri and Kansas Telephone Associations, held on May 26 and 27 in Kansas City, Kan., was attended by 565 people, up 36.5 per cent from the year previous.

A number of challenges were presented to the conventioneers, both by the intra-industry speakers—mainly along lines urging improved operation and management—and by those from outside the industry, who stressed improved understanding of the nation's young people and improved human relations.

Reverend Roger Fredrikson, of the First Baptist Church, Ottawa, Kan., titled his Pioneer luncheon talk "Our Greatest Natural Resource." He was referring to our nation's young people, and he said there is no issue today which demands more urgent attention or more need for sacrifice than "our young life. They're deeply in trouble, and this is the same crowd which is going to handle the age of space and the problems of peace."

Reverend Fredrikson added, "We talk about normal times, but we just aren't going back to normal times. This present generation has been spawned in an age of fear." He went on to list these characteristics of the younger generation:

(1) It's a generation that fights authority. They question home and church, and wonder: "Is there anything that lasts?"

(2) It's a generation that wants thrills. Feeling that many of the frontiers that preceding generations had are gone, and that life at home is drab, they search for a "jag."

(3) It's a generation that wants security. They find it often by becoming part of a crowd or herd and therein they frequently exhibit group-mindedness. When herd-mindedness prevails, individualism dies.

(4) It's a generation that is spiritually hungry. They seek a faith and are not as materialistic as perhaps they seem on the surface.

This generation can be helped, Reverend Fredrikson emphasized. He suggested: "First, train young people like adults. Our young folks have been mollycoddled too long. We should stretch their performance to more nearly match their ability."

He cited a Bible study class he had led, in which the students were not satisfied with the fare provided—they wanted more "meat." And again, in another instance, a youth group evolved more stringent rules than their parents had in the formulation of a personal code for the youngsters to aim at. Furthermore, he said, the gifted child in American schools is graduating with his real abilities unchallenged.

"Second," the Reverend suggested, "we need to strengthen the American home—fathers and grandfathers need to give more attention to their children. As it is now, the male parents and grandparents are being pulled out of the home on too many occasions."

"Third," he said, "the time has come to share some kind of faith with the people in our community." He said he believes America is far more a religious experiment than a political

Officers and directors of the Missouri Telephone Association are (standing, left to right—back row): Foster B. McHenry of Jefferson City; P. A. Browne of Mountain Grove; J. L. Van Horn of Grinnell, Ia.; E. J. Ernest of St. Louis; Clifford T. Davis of Sullivan; George A. Hearne of Kansas City; Joe M. Roberts of Gallatin; C. W. Chastain of Princeton, and Harold C. Stouffer of Diamond. Front Row (left to right): Jack E. Bartruff of St. James; R. W. Hedrick Jr. of Jefferson City, newly elected secretary-treasurer; R. W. Hedrick Sr., also of Jefferson City, chief counsel; H. Scott Gault of La Plata, newly elected president; R. E. Williams of Oregon, first vice president; Miss Elizabeth Journey of Higginsville, third vice president, and Miss Katharine A. Bauer of Jefferson City, assistant secretary-treasurer.

one; the issue is fundamentally the dignity of man—man made in the image of God. "America is still a dream—a kind of faith and a way of life. The rest of the world still looks to us to solve our problems and thus to hold out hope for others," he concluded.

In getting the general sessions under way, H. H. Welsh of Ottawa, president of the Kansas Telephone Association, reviewed briefly the progress of the Kansas and Missouri associations in the number of exchanges converted to automatic operation.

David A. Hamil, administrator of the Rural Electrification Administration, titled his talk "REA, the Independents, and the Co-ops." He stated that the telephone part of REA's program recently served its 600th borrower. Of these, nearly two-thirds are commercial borrowers, the other third being cooperatives. Also, over 458 million dollars has been loaned; of this amount 295 million dollars has been advanced to the borrower and invested in facilities.

Mr. Hamil emphasized that the farmer today must begin to be a resourceful businessman, partly due to the growing average size of farms; and one of the tools he must have is telephone service.

Mr. Hamil also stressed the point that it behooves telephone men to see that the farmer has as complete service as possible.

"Horizons of the Future" was the theme of the talk given by Clive W. Haas of Big Timber, Mont., president of the United States Independent Telephone Association. In the course of describing the USITA's organizational structure, he referred to the annual statistical summary published by the association, pointing out its usefulness as a yardstick for comparing company operating results. And, he added, the summary's value will increase as more and more companies file their reports with USITA.

Mr. Haas reviewed the situation regarding the Federal Communications Commission's impending reallocation of the 890-940 megacycle band.

"The recommendations of the new USITA Merchandising Committee can mean considerable additional revenue for the company which puts them into practice," Mr. Haas said. "You're not doing a complete job unless you merchandise. Or, stated another way, if you do not merchandise, the subscribers must go without the most or the best in telephone service."

Mr. Haas appealed to those Independents who are not members of USITA to join so that the national association might capitalize on the added prestige which more members would afford as well as the financial undergirding. One advantage of membership among others, Mr. Haas said, is that USITA has resources to handle any difficult problems which the association's board of directors deems worthy of investigation.

New officers and directors (directors' terms expiring in 1961) of the Kansas Telephone Association are (standing, left to right): Douglas Wright of Hutchinson; Hubert Froman of Edna, and Carroll Nelson of Lenora. Seated (left to right): Rolley L. King of Caldwell, vice president; Carl B. Brecheisen of Dodge City, president, and George Rooney of Belleville.

In the field of legislation, Mr. Haas said, the USITA is watching the following closely to protect the industry's interests:

Edwin M. Clark, president, Southwestern Bell Telephone Co., addressing the Kansas-Missouri Telephone Association Convention on "Getting Ready for the Future Now."

Highway relocation reimbursement. (He suggested that since the law could be repealed, companies should build lines off the highway where possible. Also, Secretary of Commerce Sinclair Weeks some time ago promised legislation aimed at removing relocation reimbursement.)

The 750-station operator exemption. (This is becoming untenable, he said.)

Increase in the minimum wage under the Wage and Hour Law.

Securities and Exchange Commission exemption.

The campaign to repeal the discriminatory federal excise tax on telephone service.

Presiding at the second convention session was Harold Stouffer of Diamond, president of the Missouri Telephone Association. In his opening remarks, he mentioned that increased use of toll service depends on availability of a uniformly high-type service. He also endorsed the offering of dial service and said it often solves a number of other operating problems when it replaces less modern types of service.

Mr. Stouffer reported, too, that the association's Small Company Committee had had its name changed to the General Industry Coordinating Committee.

The report of this latter committee, which is chairmanned by C. T. Davis of Sullivan, showed the following growth for Missouri's Independents:

Gross originated toll revenue: up

(Please turn to page 34)

NUMBER 17
Toll grade. These insulators are employed for all exchange circuits and for all toll and trunk circuits that do not exceed ten miles.

Dependable ...in emergencies

Dependability is the story of Hemingray insulators. On the line, you can depend on their strength and uniform high quality . . . when you order, you can depend on prompt delivery of what you need, when you need it.

Since 1870, Hemingray insulators have been the standard for quality on telephone and telegraph lines the world over. Dependable Hemingray Glass insulators today carry most of the world's overhead telephone and telegraph lines . . . play a major part in helping to maintain our highly dependable communications systems. These insulators are a product of Kimble Glass Company, subsidiary of Owens-Illinois, Toledo 1, Ohio.

HEMINGRAY INSULATORS
AN (O) PRODUCT

OWENS-ILLINOIS
GENERAL OFFICES • TOLEDO 1, OHIO

UNEQUALLED FOR QUALITY – DEPENDABILITY – PERFORMANCE

REX

FULLY COLOR CODED WIRES & CABLES FOR THE TELEPHONE INDUSTRY

INDEPENDENT

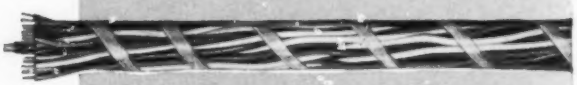
WRITE FOR CATALOG — CONTAINS COMPLETE DATA AND SPECIFICATIONS FOR ALL REX WIRES AND CABLES.

POLYETHYLENE CABLE
REA LISTED
AERIAL — DUCT — BURIED SERVICE

Utilizing polyethylene fully color coded insulation, metal shield and high molecular weight polyethylene jacket for top electrical values. Available in #19, #22 #24 and #26 AWG in 6 through 600 pairs. Type ADC for aerial and duct service; type DBC for direct earth burial service.

RURAL DISTRIBUTION WIRE— R.E.A. LISTED

Conductors insulated with high molecular weight polyethylene and jacketed with color coded, weather resistant vinyl provide good transmission values at low cost. Available in either #19 or #22 AWG with 2, 3, 4, 6, 11, and 16 pairs cabled over a high molecular weight polyethylene insulated high strength galvanized support wire.

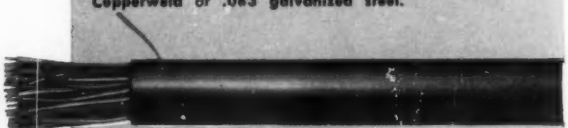


URBAN DISTRIBUTION WIRE

The rugged weather resistant vinyl insulation over the conductors is fully color coded. This construction, designed for block distribution, serves best where low cost rather than low attenuation is the prime consideration. Available in #24 AWG with 3, 6, 11, and 16 pairs.

ONE PAIR DISTRIBUTION WIRE— R.E.A. LISTED

A high molecular weight, weather resistant polyethylene extrusion encompasses the parallel conductors. A raised ridge tracer provides polarity identification. The high strength conductors make possible long spans on lateral branches or drop runs. Available in #14 or #12 Copperweld or .083 galvanized steel.



INSIDE WIRING CABLE

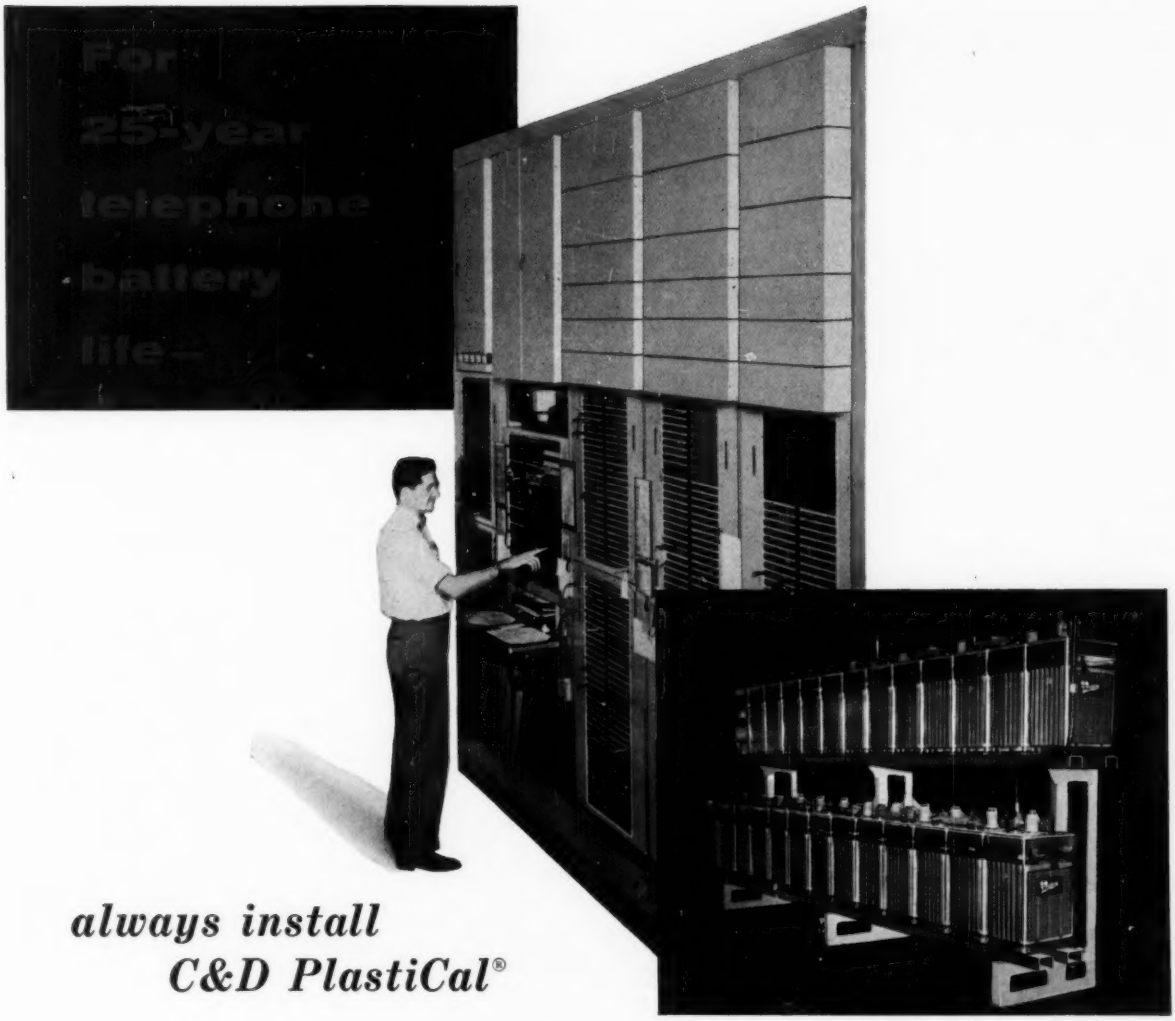
Solid, soft drawn bare copper conductors fully color coded with heat resistant polyvinylchloride insulation. All pairs twisted with varying lays to minimize cross talk and cabled to insure maximum flexibility. A tough, water resistant vinyl jacket in either brown or ivory provides good conductor protection for exposed insulation. Rip cord construction prevents damage to conductors in stripping. Available in #24 AWG with 6, 12, 16, 21, 26, 51 or 76 pairs.

REX WIRE & CABLE

Manufactured by

THE REX CORPORATION

100 HAYWARD ROAD, WEST ACTON, MASS.



always install C&D PlastiCal®

Why? Because C & D PlastiCal® batteries are the most advanced-design batteries of the last 50 years.

PlastiCal lead-calcium alloy grids are completely free from the harmful life-shortening effects of antimony found in conventional telephone batteries. By comparison, a C & D PlastiCal requires from 1/10th to 1/100th the current to maintain itself in a fully charged condition. Thus, frequency of water additions is drastically reduced.

A PlastiCal in the battery room means you can check the electrolyte level by glancing at the clear plastic case. Patented, exclusive C & D Saftee-Vents reduce maintenance by serving as always-ready, efficient funnels for temperature and hydrometer readings—*without* removing the vent.

If you need telephone batteries—a C & D representative or your telephone equipment supplier will be glad to explain the many advantages gained by installing C & D's premium telephone battery—PlastiCal. *Call him today!*

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C&D BATTERIES, INC.

of Conshohocken, Pa. ... Attica, Ind.

SINCE 1906

SALES AND SERVICE OFFICES IN PRINCIPAL CITIES FROM COAST TO COAST

Manufacturers of *Slyver-Clad* ® Industrial Batteries • PLASTICELL and PLASTICAL ® Batteries for Communications, Control and Auxiliary Power

Left Photo: The ladies were well-represented at the seventh annual joint convention of the Missouri and Kansas Telephone Associations. Here is a group relaxing between convention sessions. Right Photo (left to right): Douglas Wright, J. G. Kreamer, J. T. Naylor and Marvin A. Byrd of Charlottesville, Va., photographed outside the Grand Ball Room at the Town House Hotel.

from about 4.8 million dollars in 1953 to about 6.7 million dollars for 1957.

Gross originated tolls per company station: up from about $21.50 in 1953 to about $27.50 at the end of 1957.

At the end of 1953, 27 exchanges had been converted to automatic operation; at the end of 1957, this total had risen to 135, and by 1958's end the total is expected to be 193.

"Customers pay the penalty for a company forced by poor earnings to operate inefficiently," said Edwin M. Clark, president of Southwestern Bell Telephone Co., in his talk, "Getting Ready for the Future Now." Mr. Clark urged his audience to explain this to the public. Telephone customers, he said, have a hard time understanding that good earnings mean rates lower than they otherwise would be.

"We know a boom is coming in the 1960's," Mr. Clark said. "With good earnings now, the telephone industry can start getting ready now for the boom—make our central office buildings larger than present needs require so they can handle future demand, put in larger cable, provide more long distance circuits.

"If we've got to scrape along from year to year—and can't provide for future demand—then the telephone ratepayers will be penalized, because their rates will be higher than they would be if good earnings now permitted us to plan for the future."

Mr. Clark then turned attention to another problem of the telephone industry in getting ready for the future: strengthening management. He said:

"Management is an art for which people can and should be trained. My company has invested a lot of money—and I think invested it wisely—in management development courses. This is an investment that's paying dividends now and will continue to pay them in the future.

"The role of management is to increase productivity, spark ideas and institute innovations, control costs and push sales.

Missouri Pioneers Hold Election

At the annual meeting of the Theodore Gary chapter of the Independent Telephone Pioneer Association on May 26, the following officers and directors were elected:

President, Earl C. Ewer of Concordia; vice president, Berney Simner of St. Louis, and secretary-treasurer, Katharine A. Bauer of Jefferson City.

Directors: George A. Hearne of Kansas City, Mo.; Ralph Smith of St. Charles; Harold C. Stouffer of Diamond; W. R. Trowbridge of Springfield, and Elizabeth Journey of Higginsville.

The advisory committee is composed of: R. R. Coffman of Cameron; Fred Fairly of Kansas City, and Wesley H. Loomis III of Des Plaines, Ill. (three-year terms).

Also F. B. McHenry of Jefferson City; E. G. Aker of Parkville; Eldridge King of Sullivan (two-year terms).

Also Willard Cheney of Kansas City; F. M. Holland of Auxvasse (who died on May 29 following the convention), and Pearl Hall of Columbia (one-year terms).

"The telephone industry has been mechanizing to increase productivity since the 1920's when dial machines were introduced. But the industry is going to have to mechanize more and more each year, lest the high cost of labor expenses put an unbearable burden on earnings.

"Too often people run their businesses along the old rut. Well I say we ought to try all ways—the old, the new, the untried. Go any way you can, but . . . go for gain."

Mr. Clark stressed the importance of both public and employe relations in improving earnings and operating efficiency.

To improve operating efficiency, Mr. Clark said, Southwestern Bell is continuing its conversions to dial service in Missouri and Kansas. He added, "We also expect to be providing all our customers within the base rate area in both states with one- or two-party service by the end of 1962.

"I wonder if we in the telephone industry wouldn't do well to stop and consider whether the time hasn't passed for four-party service within the city limits. . . . The best time to eliminate four-party service is at conversion time." Mr. Clark continued:

"We're making service more dependable, too. We are:

"Pressurizing exchange cables in major cities to keep out moisture.

"Continuing our storm-proofing program.

"Replacing open wire with sturdy cable.

"Burying a great proportion of rural wire."

Russ Hannibal, area managing director, Harold Abbott & Associates,

(Please turn to page 48)

TELEPHONE BILLING SAVINGS / *truly a soft touch!*

Touch a key—and print a *complete* telephone charge description! That's how each of these special keys helps open the door to savings. And they're just *one* of the ways a Burroughs Sensimatic F305 accounting machine slashes the time and cost of telephone billing!

No more slow manual spacing on a pre-printed bill. Starting with a 3-part bill, the Sensimatic fills in *everything.* Due date, total and spacing are furnished automatically. Each charge description key activates an accumulator for that particular charge. And bill, ledger record and journal can all be posted in one operation!

The Sensimatic handles inventory, payroll—*any* kind of accounting, in fact—with the same speedy efficiency. One sensing panel can wrap up four jobs—and the panels are easily interchanged.

You don't know how easy month-end balancing can be until you've seen how it's done on a Burroughs F305. Why not phone our nearby branch office for a free demonstration. Or write to Burroughs Corporation, Burroughs Division, Detroit 32, Michigan.

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"NEW DIMENSIONS / in electronics and data processing systems"

Smart Telephones . . . Designed for

TYPE 80 DESK TELEPHONE

All the Features Your Subscribers Want!

Automatic's famous Type 80 Telephone combines beauty with function. It's the perfect companion for today's modern furnishings. Just right for family rooms or any other room in the home.

Subscribers like the Type 80 Telephone—not only for its beauty, but for its other features, too. They like the life-like transmission and the clarity the Type 80 provides. They like the choice of 10 decorator colors. And, the lighter handset, because it's easier to use.

Use the Type 80 to earn extra revenue for you. To place your order, contact your A.E. salesman or write: *Automatic Electric Sales Corporation, Northlake, Illinois. Telephone: Fillmore 5-7111. In Canada, Automatic Electric Sales (Canada) Ltd., 185 Bartley Drive, Toronto 16.*

AUTOMATIC ELECTRIC

TYPE 83 COMPACT TELEPHONE

Mounts on Any Vertical Surface!

Automatic's Type 83 Compact Telephone mounts on *any* vertical surface—wall, column, side of desk, etc. Saves valuable working space on desk and table tops. Requires only 7" x 3¼" for mounting.

Type 83 Telephones give your subscribers famous Type 80 transmission. And, you don't have to worry about stocking special parts—this phone uses standard components! There's a choice of 10 beautiful colors, too: Gardenia White, Camellia Pink, Forget-Me-Not Blue, Sand Beige, Garnet Red, Jade Green, Classic Ivory, Dawn Grey, Sunlight Yellow and Turquoise.

For complete information on all Automatic Electric telephones, write for our new Telephone Catalog. Ask for Circular 4055-G.

AUTOMATIC ELECTRIC

Modern Living by Automatic Electric

TYPE 82 DIAL-LIGHTED TELEPHONE

You See the Dial in the Dark!

With Automatic's new Type 82 Dial-Lighted Telephone, your subscriber can actually dial in the dark! Letters, numbers and finger-holes on the dial are lighted. An added convenience for which your subscriber will gladly pay extra.

Now your subscriber can make calls in darkness or twilight without groping for the right finger holes. And, when the phone rings at night, the light leads him right to it. Users tell us that the Type 82 is a handy directional guide in a dark room, too.

The Type 82 Telephone has all the famous Type 80 features—plus a lighted dial! And, it's available in any of our 10 attractive colors. Ask your Automatic representative about the Dial-Lighted Telephone. He'll be glad to give you all the details.

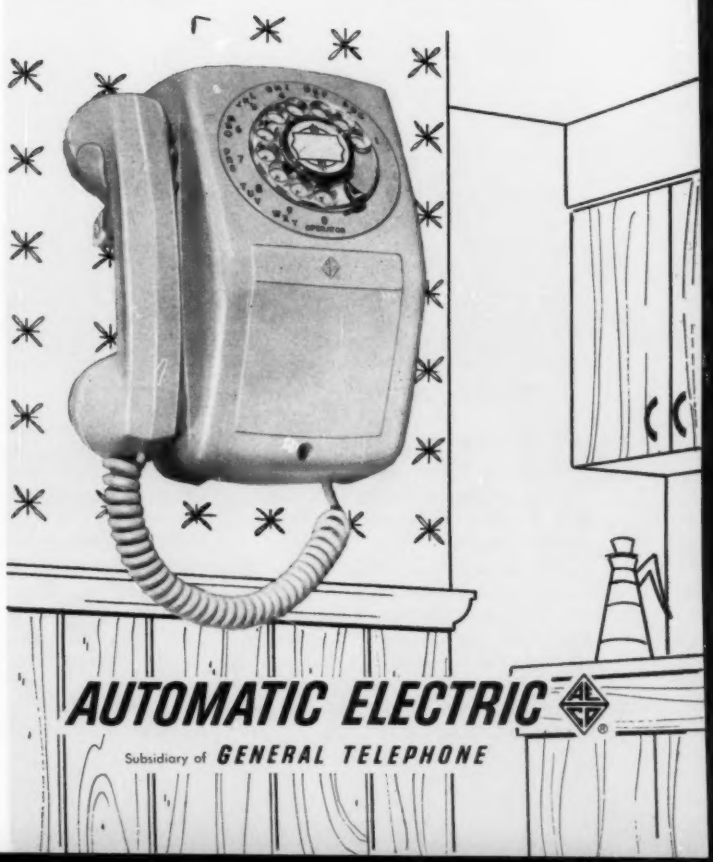
AUTOMATIC ELECTRIC

TYPE 90 WALL TELEPHONE

Saves Space in Kitchen or Hall!

The smart, functional design of Automatic's Type 90 Wall Telephone really pleases the ladies! And, since modern homes are getting smaller—counter and table space is at a premium. As a result, a space-saving wall telephone is the perfect answer for today's young homemakers.

Type 90 Wall Telephones offer a "wrap-around" cradle—on the *side* of the phone—so it's almost impossible to knock the handset off the hook. Installation is easy, too. You can get the complete story on Type 90 Wall Telephones from your Automatic representative. *Address: Automatic Electric Sales Corporation, Northlake, Illinois. Or call, Fillmore 5-7111. In Canada, Automatic Electric Sales (Canada) Ltd., 185 Bartley Drive, Toronto 16.*



AUTOMATIC ELECTRIC

Subsidiary of GENERAL TELEPHONE

Courts and Commissions

New Regrouping Procedure Asked by SB T&T in N. C.

A new principle in telephone rate adjustments in North Carolina is embodied in a proposal made on June 25 by Southern Bell Telephone & Telegraph Co. to the North Carolina Utilities Commission for automatic reclassification of exchanges when the number of telephone users increases beyond predesignated limits.

If the number of telephones increased beyond a certain level, the reclassification, with accompanying new rates, would go into effect without any formal arguments before the commission.

Under present procedure, telephone companies must go before the commission and offer evidence that the reclassification and new rates are in order.

The procedure would call for four months notice by the company before the regrouping became effective. Southern Bell contended this would not amount to automatic regrouping of the exchanges because the commission could order an investigation if it saw fit.

The commission proceeded on the basis of a ruling by Commissioner Sam Worthington, who presided, that the hearing did not involve a rate case, but only a regrouping of exchanges. He was joined in this position by Commissioner Harry Westcott. Chairman Stanley Winborne withheld a decision on this segment of the case pending formal writing of the commission order. Commissioner R. L. Whitmire indicated that he agreed with opponents of the petition, to the effect that the company was really seeking a rate increase.

OK Financing, Raise For Two Ga. Companies

The Georgia Public Service Commission recently approved the following applications:

The Hart County Telephone Co., Hartwell, was authorized to borrow a total of $45,000 in two loans from the Stromberg-Carlson Co. The loans are repayable in 20 years. The money is to be used for central office and outside plant additions and to retire existing short-term obligations.

The Sikes Telephone Co., Glenville, was authorized to borrow $485,000 from the Rural Electrification Administration, to issue 103 shares of $100 par value common stock, and to raise its rates. Proceeds from the REA loan will be used to serve some 558 new subscribers and to improve existing facilities, as well as to retire existing indebtedness of the company.

The company was authorized to charge a flat rate for multi-party rural business and residence service. Formerly, in addition to the base rate, the company had charged 25 cents for every 2 miles or fraction thereof beyond the base rate area. Old and new rates are as follows:

	Old	*New*
Multi-party rural business	$4.00	$5.25
Multi-party rural residence	3.00	4.25

The company's request to establish a new service installation charge of $15.00 per subscriber, representing the initial cost of a service installation plus one month's billing in advance for service was denied. The commission said, ". . . since the rates are based on class of service, the company's proposal would in effect result in a variable installation charge."

Pacific T&T Loses Franchise Decision in Cal.

San Francisco Superior Court Judge William F. Traverso ruled on June 16 that the city's charter gives it exclusive control over local streets and the installation of utility facilities on the streets.

The court thus upheld the stand taken by the city and rejected the Pacific Telephone & Telegraph Co.'s contention that it could install lines and poles on San Francisco streets under state authority and without a franchise payment to the city.

San Francisco's franchise to the Pacific company was issued in 1906 for 50 years and called for payment to the city of 2 per cent of the company's gross receipts and free city use of 1,000 telephones. The franchise expired in 1956 and has been the subject of negotiations between the two parties since.

The franchise netted the city $905,000 a year in addition to the 1,000 free telephones the last time the company made a payment. When the franchise expired, the Pacific T&T company told the city it would pay only $180,000 a year, and it would discontinue free telephone service under any new agreement.

When Pacific T&T filed its court application for declaratory relief last January, it said a city franchise was not necessary for operation in San Francisco because the company obtained a California statewide franchise from the state in 1907.

Company Attorney John A. Sutro announced he would appeal Judge Traverso's decision to higher courts.

Miss. Orders Southern Bell to Refund $6,000,000

Hinds County Chancellor L. Arnold Pyle on June 19 upheld the Mississippi Public Service Commission's denial of a rate increase to Southern Bell Telephone & Telegraph Co. (TELEPHONY, Nov. 23, p. 35). He directed the company to make refunds to Mississippi customers estimated at 6 million dollars representing the extra rates charged under a bonded rate increase which went into effect June 25, 1956, plus 6 per cent interest.

Southern Bell raised its rates by 2.5 million dollars annually two years ago under a new public utilities law passed by the 1956 legislature. The increase was designed as a "stopgap" while the commission studied the company's request for a raise.

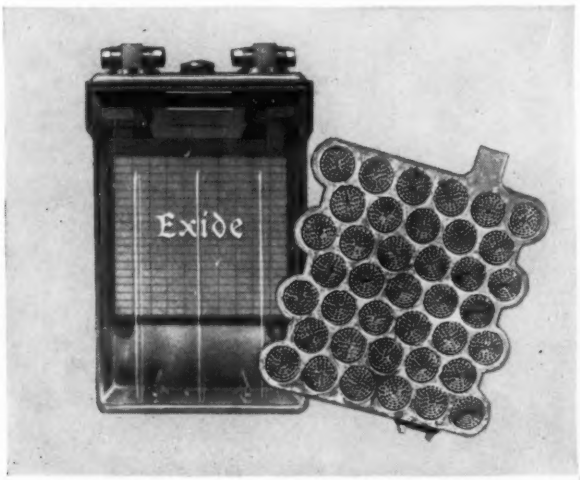
After hearings, the commission turned down the request on Dec. 20, 1956, and Southern Bell immediately appealed the decision to the First Judicial District of Hinds County.

Chancellor Pyle directed that the company "proceed with dispatch to refund by check, to each affected telephone subscriber, the appropriate amounts collected by the company since July 26, 1956 in excess of legal intra-

(Please turn to page 40)

BIGGEST CHOICE...

Exide's 2 types, 18 sizes of telephone batteries

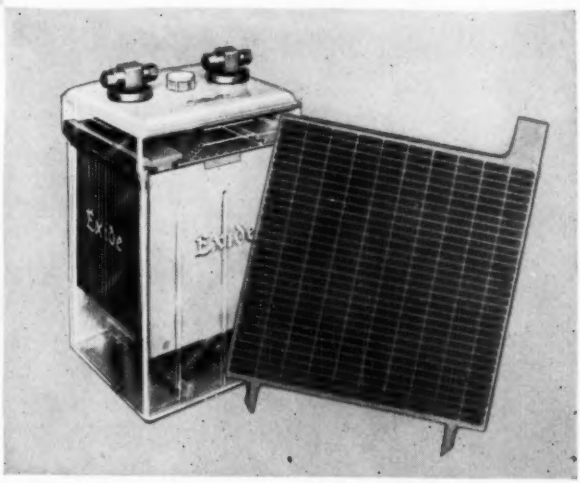


EXIDE-MANCHEX

Famous for long life the world over . . . now improved and better than ever. Qualified for use in both floating and cycling stationary service. Unique positive plate now features Silvium grids . . . Exide's patented grid alloy proved up to 100% more corrosion resistant than other alloys. Suspended plates and large bottom reservoir protect against sediment shorts. High-level electrolyte reduces frequency of watering. Four sizes from 8 to 996 amp-hr capacity.

EXIDE-TYTEX

Here is compact power at minimum initial investment. Sizes for the widest variety of specific applications have been carefully developed over the years and constantly improved. Superior materials skillfully used provide maximum power for the greatest economy. Exide-Tytex Batteries are available with positive plate grids of Silvium, Exide's patented corrosion-resistant alloy, or of lead calcium alloy —Exide played a part in the development of the calcium alloy battery. Seven models from 10 to 1680 amp-hr capacity.

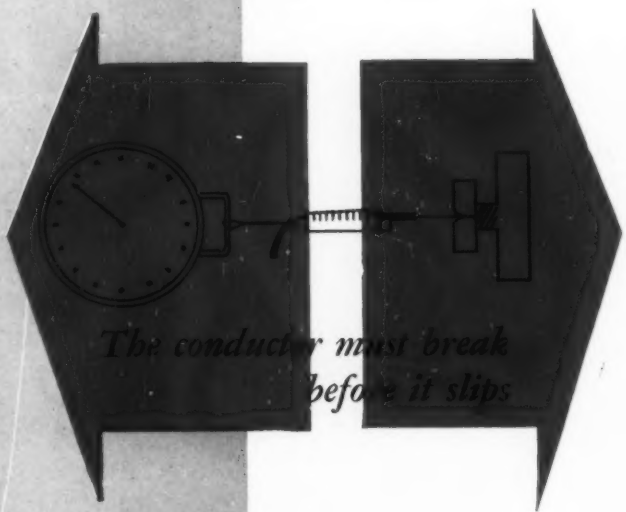


Write for catalogs with complete information. Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 2, Pa.

Exide®

ALPHADUCT

P clamp adhesion test



P clamps are the most widely used method of attaching drop wire to buildings. Lest you may worry about a P clamp causing slipping of the insulation or jacket on Alphaduct Neoprene Jacketed Drop Wire — read about this Alphaduct service test. This test is made daily.

A sample of Alphaduct wire is inserted in a P clamp with 12 inches of the wire projecting from the top of the clamp. The bail of the clamp is then inserted in the upper jaws of a tensile testing machine, and the end of the wire is stripped free of jacket and insulation and inserted in the other end of the machine.

The jaws of the machine are then gradually separated until the conductor breaks. The conductor must break before there is ANY slipping of either the jacket or the insulation.

Don't have any worries about a little old P clamp hurting ALPHADUCT drop wire. Try Alphaduct. It's dated by a color coded thread so you can see for yourself how long it lasts, how much money it saves.

ALPHADUCT WIRE AND CABLE COMPANY • NEW BRUNSWICK, N. J.

NATIONAL DISTRIBUTORS • AUTOMATIC ELECTRIC SALES CORP., NORTHLAKE, ILL.
LEICH SALES CORPORATION, CHICAGO, ILLINOIS
REGIONAL DISTRIBUTORS • PANKEY SUPPLY CO., CHARLOTTESVILLE, VA.
THE LINDSAY TELEPHONE SUPPLY CO., CLEVELAND, OHIO

state rates and charges . . . with interest at the rate of 6 per cent."

C. L. Lott, Mississippi vice president and general manager of Southern Bell, had the following to say regarding the rate denial:

"Naturally, this is quite a blow to us. . . . Feeling so strongly in the soundness and justness of our position, we went ahead in an effort to meet the service needs of Mississippi, with a full-scale construction and expansion program pending the chancery court's decision.

"We cannot continue a program of this size if we are required to operate under the rates and rate-making principles established by the commission in its order.

"The commission's order would require us to operate under rates established in 1952. Since then, in the furthering and improving of telephone service in Mississippi and in spite of constantly rising costs, we have invested an additional 71 million dollars in new facilities and granted wage increases in Mississippi amounting to about 2½ million dollars a year.

"These, with other substantial increases in the cost of providing service, have resulted in earnings that just will not attract the additional capital we need in Mississippi. The company asked the commission for an increase of only 2½ million dollars annually or a net increase of 1.1 million dollars after taxes."

The chancellor held that the commission was vested with authority to regulate rates and that "the legislature in vesting this authority in the said public service commission granted to it considerable latitude and did not undertake to establish a prescribed formula to be used in performing its duties and functions under this law."

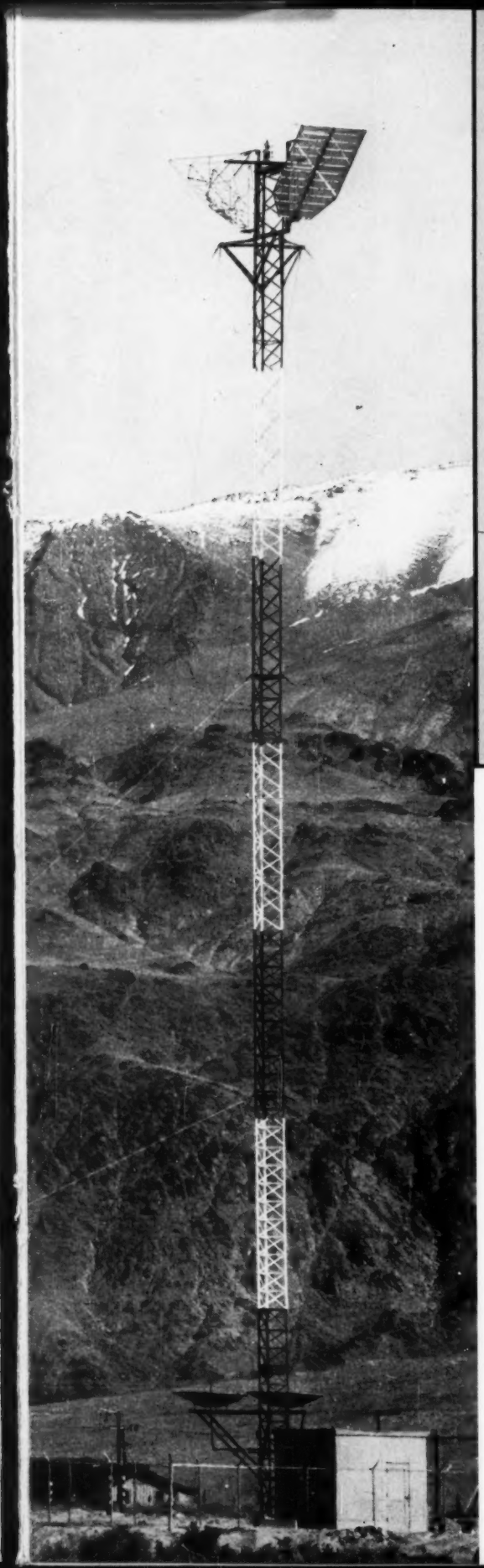
Chancellor Pyle also stated that appellate courts "have repeatedly and consistently refused to tie the hands of the regulatory body to a prescribed formula but have consistently held that the dominant standard of such statutes is that "rates shall be just and reasonable." He continued:

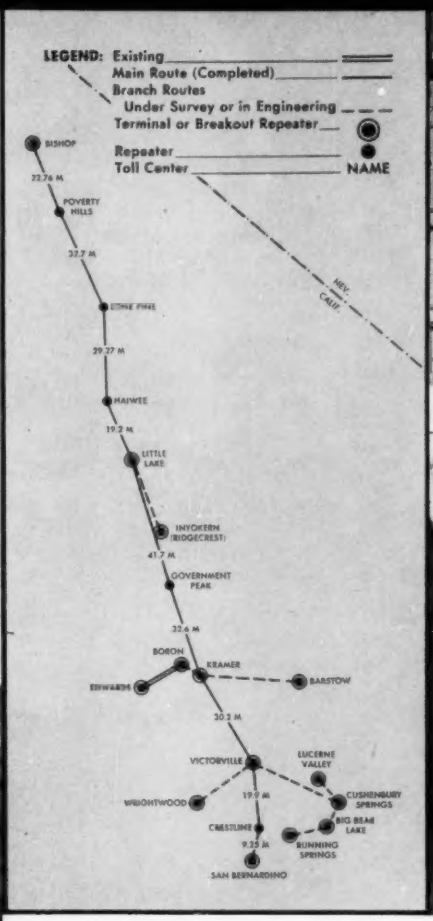
"This court cannot say that the Public Service Commission committed errors of law in handling the proceedings," Chancellor Pyle added. ". . . nor can it be found that the commission acted capriciously or arbitrarily in the entering of its order or that it exceeded its statutory authority or jurisdiction.

"To the contrary, it is the considered opinion of this court that the findings and conclusions of the commission are amply supported by the evidence and the commission's order as applied to the facts before it and viewed in its entirety produces no arbitrary result."

Southern Bell asked the rate increase on grounds that its profits were too low in relation to its investment.

The company and commission dif-





CALIFORNIA INTERSTATE EXPANDS TELEPHONE FACILITIES WITH COLLINS MICROWAVE SYSTEM

A new microwave system is now in operation for California Interstate Telephone Company. Collins Radio Company completed the 237 mile system connecting San Bernardino and Bishop, California, in May.

Collins microwave will augment CITCO'S open wire lines to meet the service requirements of new subscribers. The new installation provides for additional expansion as traffic necessitates.

The initial installation has 16 voice channels, and will be expanded this year to include 107 channels of the 320 available in the Collins multiplex. When completed, the system will furnish 105 new toll channels plus two signal channels, which will exceed 17,000 channel miles.

This system provided a means of building reliable long distance circuits at much reduced costs as compared with open wire and cable operation over the same route and decreases hazards, due to sleet, snow, wind and fire that cause interruptions to wire lines. It is expected that this 'backbone' system will give the same trouble free service that has prevailed between its Boron-Edwards system which was constructed by Collins in early 1955. The records indicate that after a year's operation, reliability was rated at 99.99 percent.

CITCO chose Collins for excellent reasons. Collins will be pleased to discuss these reasons with you. Write COLLINS RADIO COMPANY, Sales Service, 1930 Hi Line Drive, Dallas, Texas.

Collins CREATIVE LEADER IN COMMUNICATION COLLINS

fered on the estimates of the company's rate base. Southern Bell figured its investment at 72 million dollars whereas the commission held that the company was worth only 60½ million dollars.

Commenting on the court's ruling, Mississippi Public Service Commissioner Norman Johnson stated:

"Our findings were based purely upon the debt ratio factors, the ratio between the amount of bonds and the amount of common stock issues. . . ."

Chairman Johnson revealed that an investigation of legal telephone rates in Mississippi is docketed and will be held when the current rate increase case is finally disposed, it was reported.

Commissioner Johnson said that the proposed investigation would seek to determine whether the company is charging exorbitant rates on intrastate business.

Rate Raise Requested In North Carolina

The North Carolina Public Utilities Commission on June 27 held a hearing on a request of the Service Telephone Co. of Fair Bluff for permission to increase its rates by $1,377 a year on an interim basis and by $5,328 a year after it converts to automatic operation.

The company, owned and operated by J. L. Cuthrell, has 251 telephones and extensions in Fair Bluff.

It has arranged to borrow $65,000 from Stromberg-Carlson to cover the costs of converting to automatic operation. Mr. Cuthrell told the commission that the project would take about six months to complete.

Under the proposal, revenues would be increased from $8,600 to $9,977 on an interim basis and to $13,928 after the conversion. One-party business service, now $4.50, would go to $5.50 during the interim period and to $7.50 after the conversion. One-party residence service, now $3.50, would increase to $4.00 and later to $4.75.

Some of the subscribers appeared at the hearings to protest the increases and to request that extended area service (EAS) be maintained. As to EAS, Mr. Cuthrell assured subscribers that it would remain.

OK Sale of Ill. Company

The Illinois Commerce Commission on June 17 approved the sale of the Dongola Home Mutual Telephone Co. to Norman Gum and Associates of Mulberry Grove, according to Lawrence Gingery, Dongola Mutual president. The company will be reorganized as the Twin-Valley Telephone Co.

Sell Two Companies In Minnesota

The Minnesota Railroad & Warehouse Commission on June 16 authorized sale of the Marietta Telephone Co. (290 stations) to the Farmers Mutual Telephone Co., Cerro Gordo.

•

Also with commission approval, the Frost Telephone Exchange (130 stations) became the property of the Frost Telephone Co. on June 23.

Mason Retires; Blakeslee, Lattin, Head General of Cal.

Charles F. Mason, chairman of the board of General Telephone Co. of California, on June 25 announced his retirement from active leadership of the business which he founded and which has seen great growth in the last decade.

C. F. MASON

The board of directors at the same time elevated Edwin M. Blakeslee from president to chairman of the board, elected Leroy E. Lattin, president and made Mr. Mason honorary chairman of the board, effective, July 1, 1958.

Mr. Mason, who founded the General Telephone Co. of California in 1924 as the Santa Monica Bay Telephone Co., with 10,000 telephones, has seen it grow to over 915,452 telephones today. He will continue as a member of the board as well as serving as honorary chairman.

Mr. Lattin has had over thirty-five years of experience in the telephone business. For 11 years he served as vice president of two Bell companies, Ohio Bell and later Southwestern Bell in charge of various departments, including personnel, revenue requirements, and public relations, as well as

E. M. BLAKESLEE

having been vice president and general manager.

Mr. Lattin left the Bell System early in 1957 to organize the Mid-Continent Development Council in Kansas City of which he became president. In Sept. 1957 he became vice president and consultant to the president, Donald C. Power, General Telephone Corp.

L. E. LATTIN

Mr. Blakeslee became president of the company, then the Associated Telephone Co., in 1947. He is a native of Missouri and a graduate of Leland Stanford University with a master's degree in electrical engineering.

He started his telephone career with Pacific Telephone & Telegraph Co. in 1923. Mr. Blakeslee joined General in 1929 and was transferred to the central group of companies in Madison, Wis., where he became vice president of the group's five companies. In 1944 he became president of the General companies in Michigan, Indiana, and Kentucky.

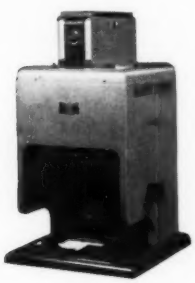
Now... more than 500 independent telephone companies get bills out this easy way!

IMAGINE—you can cut your billing costs in half, just by taking pictures! It's that easy with the unique Recordak Toll Billing System, tried and proved by more than 500 independent telephone companies throughout the country.

Here's how this easy Recordak System works: Add up all toll charges . . . enter this total and tax on bill . . . then photograph tickets and bill in a Recordak Junior Microfilmer. Clip them together and send on to subscriber. 200 calls or 2—you make only 5 entries per bill at most—regardless of number of calls!

Companies with as few as 500 subscribers have adopted this system. It eliminates hours of tedious transcription work . . . reduces chance for error to strictest minimum. Subscribers like it, too—getting toll tickets with the bill ends questions about forgotten calls.

Only $550! That's right—you can have a Recordak Junior Microfilmer for as little as $550; also available on low-cost monthly rental plan.



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The name Klein on leather goods is known and preferred by linemen and electricians everywhere. Klein tool belts, safety straps, pouches and pockets represent the highest in quality, the safest in design and construction.

In safety straps, Klein-Kord was the first specially woven fabric strap designed to permit the use of a tongue-type buckle without risk of slitting or ripping, even under severe strain.

Now Nylon Klein-Kord safety straps are the newest Klein development offering maximum safety with maximum flexibility. These are the only nylon straps designed to meet the tests given in Edison Electric Institute Report AP-2.

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SAGE—A Report to the Independents

Continued from page 23

partial answer in handling the occasional selective frequency fades experienced above 1,000 mc. The occasional "deep" fade, due to unusual conditions in the transmission path, is also uneconomical to counter via shorter repeater paths.

Fast switching of frequency, or space diversity type radio systems, gains some "in-service" time, as compared to normal switching methods used on systems switching on equipment failure; however, each switch may cause errors in SAGE transmission so that systems relying on better path conditions will serve better. A difference of only 10 db may mean the difference between 99.9 per cent or 99.99 per cent continuity in service.

No particular advantage can be gained through frequency diversity switching in the 900 mc range, as the allocated band is too narrow. Fortunately, in this band selective frequency fading is broader and not as deep as at 6,000 mc. To gain any appreciable "in-service" time by frequency diversity in the 6,000 mc band, the frequency assignments should be at least 120 mc apart, out of a possible present band of 500 mc. Adequate improvement may be realized by smaller separation provided other factors compensate, such as shorter paths, higher gains, etc.

Although frequency diversity assignments are permitted by FCC rules governing Domestic Public Radio Services, the use of two bands or separate frequency assignments for very light routes should be avoided around conjested areas. Where heavy usage is expected, diversity assignments are recommended above 1,000 mc. Already there are plans to use every available channel (in one known area) permitted by present technological advances. No doubt there will be a scramble soon as such plans do not take care of others vitally interested.

It has been found that "white" noise existing in radio equipment has very little impulse noise present. White noise is a fairly constant level hissing or sizzling type sound heard over high gain telephone carrier systems when the received signal level is very low or just plain missing. Similarly, channelizing equipment has essentially no impulse noise characteristics when maintained properly.

Engineering telephone circuits having conservative transmission characteristics may involve a somewhat higher initial cost; however, it will result in need for less maintenance effort, particularly for high quality equipment.

Commercial Aspects

DDT's, DDR's and associated test equipment, along with carrier or other facilities, are owned by the local telephone company and are furnished with a data service. The military, however, owns and maintains equipment equivalent to DDT's and DDR's which were incorporated into some early installations. When such customer-owned equipment is used, channels only are obtained from the telephone company rather than complete data service. In all cases, there will be a demarcation terminal strip where the telephone company and the Air Force meet. Since "know-how" peculiar to SAGE is involved in an application, it will usually be to the telephone company's advantage to purchase equipment on an engineer, furnish and install basis—from manufacturers fully aware of service requirements and related technical problems.

Considerable uninformed discussions have evolved around the procedure to be followed by a telephone company confronted with the need for providing services to the military, specifically in connection with the SAGE project. Those having experience with the military are already aware of the procedures to follow. Special government services are no different from those of any good local business, with the exception of requiring priority attention when certain types of service are reported out of service. It is assumed, of course, that any special government services are properly engineered, that proper toll quality is provided, and that adequate maintenance effort is exercised. By toll quality, it is meant services in accordance with standards established by the commercial telephone industry.

For those not experienced in dealing with the military, here are a few rules to observe:

(1) A commercial telephone company should do nothing for government services requiring reimbursement without first acquiring a formal contract, properly approved by a headquarters which can authorize payments. Any subsequent services or modifications provided under such a contract must also be properly authorized before any payment can be made. Verbal agreements have no meaning for payment and all negotiations must be in writing.

(2) A contract is drawn up for each

(Please turn to page 47)

K. L. Schroeder

PAYSTATION REVENUE FROM COURTHOUSE BOOTH, FREEPORT, ILLINOIS

May, 1957	$143.75
June, 1957	160.30
July, 1957	194.90
August, 1957	206.15
September, 1957	217.30
October, 1957	206.15
November, 1957	169.35
December, 1957	126.50
January, 1958	130.65
February, 1958	98.02
March, 1958	121.25
April, 1958	177.85
TOTAL	**$1,952.15**

"Our New Paystation Brings in 162^{68} per Month"

REPORTS K. L. SCHROEDER, GENERAL MANAGER, NORTHWESTERN TELEPHONE COMPANY

In the center of America's dairy farming country, 118 miles northwest of Chicago, lies the beautiful city of Freeport, Illinois—headquarters of Northwestern Telephone Company. Here, on the same soil where Lincoln and Douglas once debated, is the Stephenson county courthouse—meeting place for farmers, businessmen and shoppers. K. L. Schroeder, general manager of Northwestern, figured that this would be a perfect spot for a paystation. And, how right he was! The station brings in an average monthly income of $162.68—all *extra* income, since there has been no decrease in income from paystations in nearby stores!

Let us help you make paystations pay-off in your town. Write for a free copy of our Survey Simplifier. It helps you find paying locations for paystations. Write Automatic Electric Sales Corporation, Northlake, Illinois. Or call, Fillmore 5-7111. In Canada, Automatic Electric Sales (Canada), Ltd., Toronto 16.

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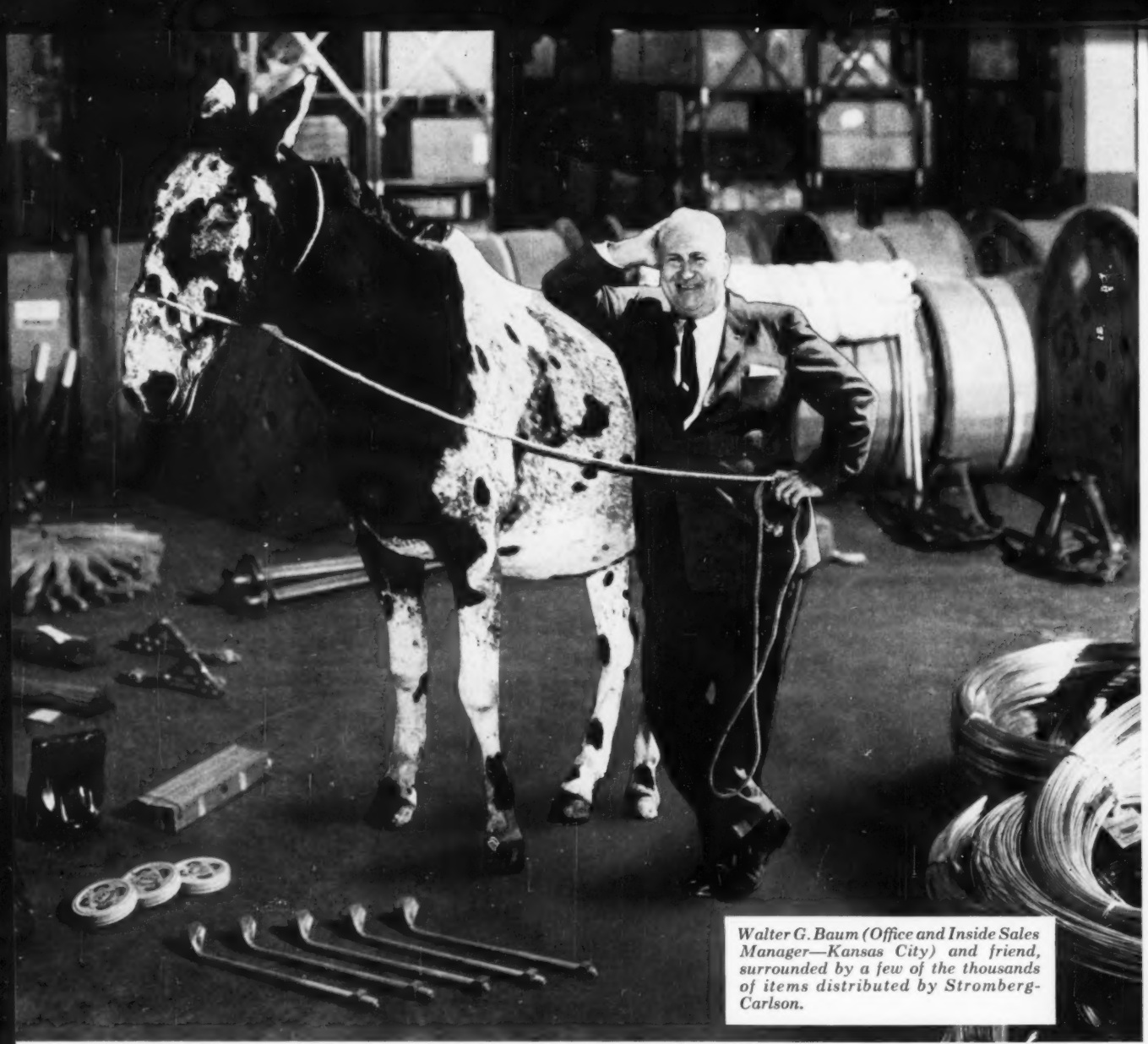

Walter G. Baum (Office and Inside Sales Manager—Kansas City) and friend, surrounded by a few of the thousands of items distributed by Stromberg-Carlson.

"In Missouri, even Jenny was convinced!"

The rumors you may have heard about people and animals in this part of the country are grossly exaggerated.

There's a vast difference between a healthy "show-me" attitude and the sheer stubbornness attributed to our good friends, human and animal, by idle rumor-mongers.

Actually, it's easy to convince Missourian telephone people (and others all over the U. S.) that it pays to buy construction and maintenance supplies distributed by Stromberg-Carlson.

We simply *show* them (in Missouri and elsewhere) that these products offer 3 important benefits:

- the guarantee of the manufacturer
- the guarantee of Stromberg-Carlson, backed by 62 years of leadership in telecommunications
- a good slice of what we earn from your supply orders supports our research and development in products designed to reduce your operating costs and increase your revenue.

For instance: refinements in XY® CDO equipment, toll ticketing . . . subscriber PX switchboard systems like our revenue-boosting 2-10 and 4-20 . . . the 6K-1 "fingertip" PBX, which pays the greatest return on the dollar of any product in the industry.

Whether or not you're from Missouri, we'd welcome an opportunity to show you how we can meet your supply needs.

In Kansas City our Sales Office and Warehouse is located at 2017 Grand Avenue. Telephone: HArrison 1-6618.

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military base or site. The company must determine exactly who the proper authority is before going ahead with any work. Normally, telephone companies may negotiate through the local communications officer, since he usually is given the responsibility for providing necessary communications.

(3) If difficulty is experienced in determining the proper authority, inquiries may be made to the Air Defense Command, the customer. However, most telephone companies (including non-Bell) utilize the services of the Defense Communications Manager of the American Telephone & Telegraph Co., Kansas City 5, Mo., for handling Air Force SAGE orders. Orders placed through this channel are passed on to non-Bell companies through the connecting Bell company. Generally, it would be advisable for correspondence to go through the same channels. However, should it become necessary to contact the Air Force directly, correspondence should be addressed to: Commander, Air Defense Command, Attn: ADOCE-LP, Ent Air Force Base, Colorado Springs, Colo. Of course, adequate identification of a specific project should be included in any correspondence.

Security requirements for representatives of commercial telephone companies are not complicated. Special service requirements involving SAGE are being disseminated on a "need-to-know" basis. Should it be necessary to make an on-the-spot survey on a military base, the local military representative should be advised in writing at least a week prior to the visit explaining the intended purpose. Also include the name, address, position and security clearance of all those who will be in the party. Maintenance men require the same clearance as men engaged in maintenance of existing telephone plant on a military station. Clearance may be arranged for through the local military representative.

Negotiations should include a formal statement specifying a time, *after receiving formal approval*, when it is expected to complete provision of facilities needed. Air Force approval for overtime charges must be secured when applicable. It currently takes approximately six to nine months for a manufacturer to obtain digital data transmitter and receiver units and associated special equipment from the Western Electric Co.

Engineering, furnishing, and installing time may be estimated at 12 to 18 months after receiving official approval of a proposal. This should leave ample time for individual telephone companies to provide necessary facilities without undue effort or overtime charges.

Termination charges to cover any extra costs not otherwise recoverable, as well as payment requested for necessary modifications or changes, should be part of any agreement. Predetermined special charges may be recoverable, by agreement, as part of the monthly or bi-monthly billing. These procedures are generally followed by any company providing special services to a contract customer.

Conclusions

The SAGE system requires a widespread private line network due to the size of the area to be defended and the necessity for high speed communications. Although most SAGE circuit routes and service locations are in Bell System territory, many are in non-Bell areas also. To provide SAGE service is to gain a desirable customer. The provision of data and other services, many involving the use of new equipment and methods, offers a telephone company an opportunity not only to participate in an essential defense activity today, but also to gain experience in services and concepts likely to play a major role in more common communications tomorrow.

K. A. Boshart Chosen President of Neb. Pioneers

Kenneth J. Boshart of Lincoln, Neb., on June 7, was elected president of the Frank H. Woods chapter of the Independent Telephone Pioneer Association in a statewide election. He succeeds Ernest Royce of Lincoln.

Other officers elected were Clara Jones, vice president; Florence Tatman, secretary; and Robert T. Ross, treasurer. Melba Richards and A. L. Ager were elected as members of the executive committee. All are of Lincoln.

The statewide chapter is the largest Independent telephone organization in the United States. It has a membership of 573, a gain of 33 over last year.

L. W. Routh Named President Of Guilford (N. C.) Company

Lawrence W. Routh has been elected president of the Guilford Telephone Co., Guilford College, N. C. The company recently was reorganized from a mutual firm into a stock company.

Other officers elected by the new board of directors on June 26 are: Irvin Angel, vice president, and Hubert R. Thomas, secretary-treasurer.

OK Purchases in Minnesota

The Minnesota Railroad & Warehouse Commission on June 23 granted approval of the Pineland Telephone Co.'s purchase of three Independents: the Carlton County Farmers Cooperative Telephone Association, Cromwell (194 stations); the North Pine Telephone Co., Askov (340 stations), and the Finlayson Telephone Co. (240 stations).

"We're convinced about Kennecott Cable"

We're quite mulish in our conviction that Kennecott gives you the 3 qualities you need most in telephone cable: *uniformity, dependability, lasting service.*

Before leaving the factory, every inch of cable is thoroughly tested for dielectric strength, insulation resistance, capacitance and fixed dimensions.

This kind of thorough-going "show-me" testing is your assurance of economical, trouble-free operation in the field.

Want to be shown yourself? Next time you need telephone cable, specify Kennecott, distributed by Stromberg-Carlson.

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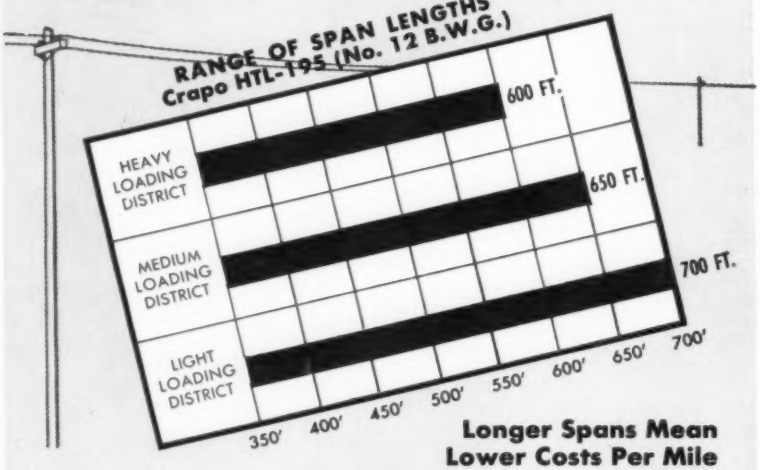
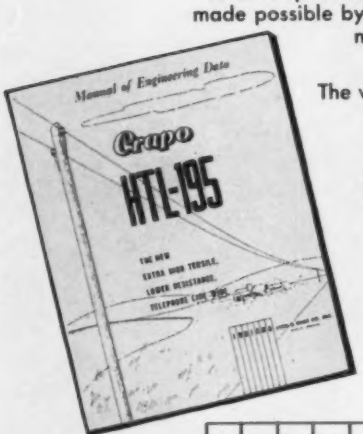


Longer Spans Mean Lower Costs Per Mile

You can cut the number of pole structures to a minimum when you use **Crapo** HTL-195 in building rural telephone lines. Extra long span construction, made possible by the high physical strength of this new wire, means marked savings in material and installation costs.

The voice transmission quality of **Crapo** HTL-195 is equal to that of **Crapo** HTL-135 and superior to older grades of ferrous wire.

Pertinent technical data have been prepared to assist engineers in designing and building extra long span lines with **Crapo** HTL-195.



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INDIANA STEEL & WIRE COMPANY, INC.
MUNCIE, INDIANA

PLANT MAN'S NOTEBOOK

Concluded from page 24

at which it takes over the station load. This transfer of power is made without the loss of a single character on the teletypewriter system.

When the commercial power is restored, the gas engine generator stops, the storage battery is recharged and then maintained on a trickle basis so that it will be always ready to care for a power failure.

We also rode an Army L-20 airplane from Crissy Field, on the Presidio, to the Sacramento Signal Depot. We took off from this small air strip, circled near the Golden Gate Bridge and headed across San Francisco bay and directly over Alcatraz. This was a bright sunshiny morning, but for some reason we did not have our camera. The flight over this rich Sacramento Valley is well worth one's time.

We were able to obtain many good color shots on this trip as the result of the sunshiny weather. Our good friend, W. E. Nichols, chief engineer in the Signal Office, Sixth Army, drove us to the top of Twin Peaks one bright afternoon where we took several good pictures of the bay area.

We will never cease to marvel the fact that one can travel across this country twice and see so much in one short week. Air travel, of course, makes this possible, and good communication, too, plays a most important role. That travel is "broadening" we also agree, especially if you happen to dine regularly in the good restaurants of San Francisco.

KANSAS-MISSOURI MEETING

Continued from page 34

Inc., Mission, Kan., speaking on "Do-It-Yourself Success," defined success as the progressive realization of a worthy goal.

Mr. Hannibal said that gaining success in the mental area of life (as differentiated from the spiritual and physical) requires one to fight life's greatest battle — gaining control of one's self. The following is Mr. Hannibal's listing and comments on attributes of one who has self-control:

(1) Self-confidence. "Do the thing you fear to do and the death of fear is certain." Also: "We need to know ourselves."

(2) Ability to get along with people. "Be a good listener—become genuinely interested in the other person. Remember the other person's name."

(3) Genuine personal enthusiasm. "It is said, 'Feeling follows action.' Act

enthusiastic and you'll be enthusiastic. Count your blessings and become enthusiastic."

(4) Freedom from worry. "Remember that the great proportion of things one worries about never happen." He advised an actual check of this statement.

Mr. Hannibal then expanded on a success formula, of which the following is an outline:

Decide to do it.

Pretend that the goal has been reached (negative thinking undermines confidence).

Never take "no" from within or without.

Listen to your hunches.

The Kansas association elected the following directors:

Carl B. Brecheisen of Dodge City; S. V. Lyons of Kansas City, Mo.; E. C. Smith of Topeka; and H. H. Welsh of Ottawa (terms expiring in 1959).

Also Rolley L. King of Caldwell; R. J. Fegan of Junction City; Tom Laming of Tonganoxie, and Paul Grauer of Wilson (terms expiring in 1960).

Also Hubert Froman of Edna; Carroll Nelson of Lenora; George Rooney of Belleville, and Douglas Wright of Hutchinson (terms expiring in 1961).

Kansas directors elected the following officers: President, Mr. Brecheisen, and vice president, Mr. King. Secretary, Douglas Gleason, and treasurer, John S. Hopkins, both of Topeka.

The Missouri association elected the following directors:

Jack E. Bartruff of St. James; C. W. Chastain of Princeton; J. L. Van Horn of Grinnell, Iowa, and Edward G. Greber of St. Louis (terms expiring in 1961).

Also (terms expiring in 1960) E. J. Ernest of St. Louis; P. A. Browne of Mountain Grove; J. M. Roberts of Gallatin; W. R. Trowbridge of Springfield (elected to fill unexpired term of H. Scott Gault who was elected president).

Also Clifford T. Davis of Sullivan; George A. Hearne of Kansas City; John Holden of Cassville, and Foster B. McHenry of Jefferson City. Ex-officio member of board of directors: Harold C. Stouffer of Diamond.

Missouri directors elected the following officers: President, H. Scott Gault of La Plata; first vice president, R. E. Williams of Oregon; second vice president, O. C. Agne of Wentzville; third vice president, Miss Elizabeth Journey of Higginsville; fourth vice president, J. C. Torbett of Wright City; secretary-treasurer, R. W. Hedrick Jr.; assistant secretary-treasurer, Miss Katherine A. Bauer, and chief counsel, R. W. Hedrick Sr., the latter three of Jefferson City.

Obituaries

VERN E. LARSON, 50, vice president and general manager of the United Telephone Co. of the Carolinas, Southern Pines, N. C., died of a heart attack on June 22 while swimming in the surf at Beaufort, S. C.

Mr. Larson formerly was with the United Telephone Co. of New Jersey at Newton, N. J. He left to take the United of the Carolinas post in January.

He started his career in the telephone industry in 1927. Mr. Larson was a member of the Independent Telephone Pioneer Association.

Surviving are his widow, his daughter, Patricia, and two sons, Craig, a Marine stationed at Opa-locka, Fla., and Bryan of Southern Pines.

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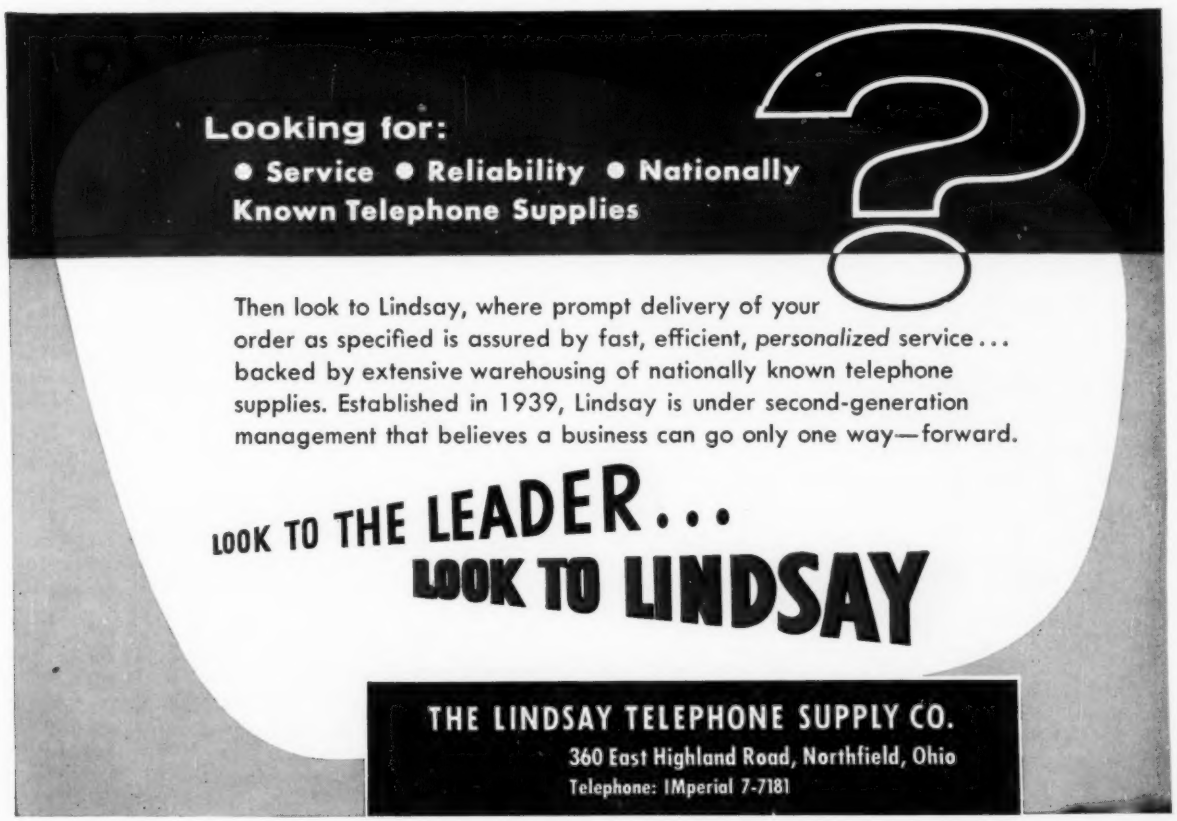
KARL W. MOHR, 49, general manager of the North-West Telephone Co., Tomah, Wis., died on May 25 after suffering two heart attacks in succession.

Mr. Mohr, who was born in Wausau,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Then look to Lindsay, where prompt delivery of your order as specified is assured by fast, efficient, personalized service... backed by extensive warehousing of nationally known telephone supplies. Established in 1939, Lindsay is under second-generation management that believes a business can go only one way—forward.
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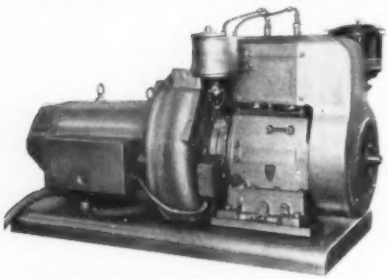

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. . . the slightest drop in voltage. Actually *anticipates* power failure BEFORE voltage drops below a usable level.

ACTS...

. . . automatically to guarantee absolutely uninterrupted power. Not one precious second lost in load transfers.

SAVES...

. . . UP TO $300 PER MILE on new Micro Wave installations. Just one compact Micro-Power Unit replaces a costly array of complicated equipment.

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Wis., started his telephone career 32 years ago. He began with the Eastern Wisconsin Telephone Co. at Chilton (now a General Telephone Co. of Wisconsin exchange).

He served as district manager during the time the Chilton district was a training center for construction crews and managers. This training center was under Mr. Mohr's supervision.

In October 1942, Mr. Mohr resigned from General to become district manager with the Iowa Continental Telephone Co., then at Washington, Ia.

Moving from Iowa back to Wisconsin, for 14 years Mr. Mohr was general manager of the Monroe County Telephone Co., Sparta. After leaving the Monroe County company, he joined the staff of the North-West company.

Mr. Mohr at the time of his death had recently been named to the board of directors of the Wisconsin State Telephone Association. He was a past president of the Badger State Chapter of the Independent Telephone Pioneer Association.

Survivors include his wife, the former Dorothy Goodin; a son, James, of Denver, Colo., and one granddaughter.

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E. G. AKER, president and general manager of the former Parkville (Mo.) Telephone Co., now an exchange of Southwestern Bell Telephone Co., died in Parkville on June 19. He had been in failing health for the past several months.

Mr. Aker, who started his career in the telephone industry in 1909, was a member of the advisory committee of the Theodore Gary chapter of the Independent Telephone Pioneer Association.

Harry W. Pike Retires From General of Illinois

Harry W. Pike retired on June 1 as vice president of General Telephone Co. of Illinois after nearly 30 years of service.

He joined the staff of the Commonwealth Telephone Co. (now the General Telephone Co. of Wisconsin), Madison, in 1928 as general auditor. He later was transferred to other group positions as commercial engineer, commercial superintendent, and rates and tariffs engineer.

Mr. Pike had held his position as vice president of the company for the past 10 years and he had served in the double capacity of treasurer-vice president of the organization from 1936 to 1948.

He is a graduate of the University of Nebraska School of Business Administration and he took graduate work in business statistics at Columbia University and in auditing at New York University.

For two years, he taught accounting and economics at the University of Nebraska. He also has had wide experience in public and utility accounting.

In 1945 he was named chairman of the USITA Commercial Committee and a member of USITA's Rural Telephone Service Committee.

IN THE NATION'S CAPITAL

Concluded from page 18

nected regional direction centers . . . which are linked to a national command center."

The SAGE system uses radar units mounted on "Texas towers" to extend the air defense range farther out from shore. These giant-legged platforms are mounted more than 100 miles out to sea, while others are land-based. The system is capable of detecting aircraft "while they are still several hundred miles away," officials said. The long-range systems operate round the clock, keeping one channel in operation and another on stand-by.

Bendix Aviation Corp. officials said the heavy radar units "generate so much energy that a liquid-cooling system is required to prevent the main transmitting tube, or power amplifier, from melting." The radar system emits pulses of energy from a rotating 440-foot antenna, housed inside a 2,300-pound rubberized bubble, or radome.

The radar system "sweeps" the horizons at extreme altitudes. When sweeps overlap at high altitudes, the curvature of the earth leaves a "gap of unscanned air," according to Bendix officials. Thus, to plug these holes, "medium power gap-filler radar sets" transmit information by telephone to the main centers where it is then oriented to the whole.

The SAGE system uses "a built-in intelligence" device to separate fixed from moving targets. Automatic measuring devices determine bearing and distance to the target. Computers for SAGE were manufactured by International Business Machines Corp., for which Bendix is a subcontractor. Bendix laid out an engineering and production effort of some 90 million dollars.

Graybar Appoints Two

W. J. Goerisch, Atlantic district manager of the Graybar Electric Co., Inc., announced the appointment of P. J. Zimmerman as operating manager at Harrisburg, effective June 16, and J. C. Finegan as operating manager at Washington, D. C., effective July 1.

Kellogg Names Sales, Export Region Managers

K. C. Tompers has been named field sales manager of Kellogg Switchboard & Supply Co., a division of International Telephone & Telegraph Corp. His

K. C. TOMPERS

appointment was announced recently by George T. Scharffenberger, Kellogg president.

The former western region manager will move to headquarters in Chicago from which he will direct all commercial activities of the six regions recently established under Kellogg's decentralization program.

Regional managers will report to Mr. Tompers who will report to O. C. Bailey, vice president and general sales manager.

Mr. Tompers, a native of Susanville, Cal., began his career with Kellogg in 1947. He previously was employed by Public Utilities California Corp. (now Citizens Utilities) as central office equipment engineer.

He gained prior experience in the communication field as plant superintendent at the San Joaquin Telephone Co., Manteca, Cal., and as equipment engineer at West Coast Telephone Co., Forest Grove, Ore.

A Navy veteran with three years of service during World War II, he saw duty at Kodiak, Alaska; Saipan, and Okinawa.

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In other Kellogg appointments, John A. Russell has been named manager of the export region, one of the six recently established sales regions.

In his new position, Mr. Russell is responsible for all the company's commercial activities concerned with the export region. His office is at 165 Prospect St., Passaic, N. J.

Mr. Russell joined Kellogg in February, 1957, after 28 years of service

J. A. RUSSELL

in the U. S. Army. A retired lieutenant colonel, he saw duty in every corner of the world. He is a native of AuSable Forks, N. Y.

30 Day Free Trial Offer!!

The All New Terminating Board Model TBZ

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We'll gladly send one TBZ Terminating Board to each division or area for a 30 day free trial. No obligation! If you don't see that the fabulous TBZ will *save you money, save hours of time, is simpler to use,* and *has a wider variety of uses,* send it back in 30 days and there will be no charge.

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Left Photo: General headquarters for the Ogden Telephone Co., Spencerport, N. Y. is this newly erected building which contains the public office, billing, executive, commercial and accounting offices, classrooms, and lounges. It also houses a seven-position toll board, the XY dial switchboard and the automatic office for the Spencerport exchange. The company also has dial offices in North Chili and Hilton. Three hundred square miles and 5,000 stations are in the area served by the company. Right Photo: A group giving smiling admiration to the new F-40 XY PBX serviced by Ogden Telephone Co. at Roberts Wesleyan College for the past nine months are Donald F. Davison, president of the Ogden company; T. C. Thompson, telephone sales manager of Stromberg-Carlson; Ellwood A. Voller, president of Roberts Wesleyan College, and Lucia Dunseith, secretary to Dr. Voller.

REA Announces Latest Telephone Allocations

THE Rural Electrification Administration has approved the following rural telephone loans:

Chisago City (Minn.) Telephone Co.; $396,000; June 6.

The borrower plans to improve service for 746 rural subscribers and to furnish initial service to 123 farm families. The families which will receive improved service are now being served by the Chisago County Mutual Telephone Co. at Center City. These facilities will be acquired, expanded, and integrated by the borrower.

Present plans of the borrower call for expansion of its present Lindstrom exchange to serve a portion of the subscribers provided for in this loan. In addition, a new automatic central office at Almelund will replace the acquired magneto facilities. Total loans to the Chisago City borrower amount to $912,000. This will enable the company to furnish new and improved service to 2,156 rural subscribers. The system will consist of four exchanges. Those at Chisago City, Lindstrom, and Wyoming are under construction.

Ernest E. Strand is president of the Chisago City Telephone Co., and Lambert J. Greene is manager.

•

Tri-County Telephone Association, Basin, Wyo.; $174,000; June 9.

These funds will be used by the borrower to improve service for 17 rural families who own their own lines, and to furnish initial service for 151 farm families. The borrower plans to acquire the switched lines owned by the 17 families. One of the switcher lines will be acquired by abandonment. The remainder of the facilities will be acquired with the borrower's own general funds. A new automatic central office will be constructed at Hamilton Dome.

REA loans to the Tri-County Association, totaling $512,000, will enable it to provide new and improved service to 602 rural subscribers. The enlarged system will consist of three exchanges. The Burlington and Ten Sleep areas are now providing dial service to approximately 350 subscribers.

Earl Davis is president and Robert Aiken is manager of the Tri-County Telephone Association.

•

Wilson County Telephone Co., Floresville, Tex.; $320,000; June 10.

The borrower plans to use these funds to improve service for 184 rural subscribers and to furnish initial service for 165 farm families. To carry out this service, the Wilson County company intends to acquire the Kosciusko Telephone Exchange without the use of loan funds. This exchange is presently furnishing magneto service to the 184 existing subscribers.

The borrower's schedule includes rehabilitation and integration of the Kosciusko facilities. New automatic central offices will be constructed at Gillett and Kosciusko. REA loans to the Wilson County company total one million dollars with which it will be able to furnish new and improved service to 1,981 rural subscribers. Automatic central offices will be located at Floresville, Gillett, Kosciusko, and Poth.

Earl W. Nunneley is president and manager of the Wilson County Co.

•

Hopper Telephone Co., Inc., Altoona, Ala.; $440,000. June 11.

These funds will be used by the borrower to improve service for its 169 present subscribers, and to furnish initial service to 618 rural families. The company is now providing magneto service through its Altoona central office. New construction planned by the Hopper company includes automatic central office buildings at Altoona and Sneads Crossroads. The Altoona building will also house commercial office facilities.

Wilbur L. Hopper is both president and manager of the Hopper Telephone Co.

•

Union Point (Ga.) Telephone Co.; $50,000; June 11.

These funds will be used to provide service to 44 subscribers not included in a previous loan. Loan funds will also enable the borrower to furnish dial

mobile telephone service to five subscribers in its area. In addition, provision is made in this loan to complete the authorized system.

The two REA loans to this borrower, totaling $396,000, will enable it to furnish new and improved service to 810 rural subscribers. The two exchanges—Union Point and White Plains—are now furnishing dial service to approximately 730 subscribers.

J. H. Darby is both president and manager of the Union Point company.

•

Park Region Mutual Telephone Co., Underwood, Minn.; $63,000; June 13.

These funds will be used by the borrower to improve service for 100 rural subscribers, and to furnish initial service for 45 farm families. The families who will get improved service are now being served by three subscriber-owned lines. They plan to abandon these lines and to become regular subscribers of the Park Region company.

The borrower intends to construct a new automatic central office at Vining. REA loans to this borrower, totaling $588,000, will enable it to provide new and improved service to 1,193 rural families. Of the five automatic exchanges, those at Dalton, Maine, and Underwood are in operation furnishing service to more than 900 subscribers. The Earhard and Vining exchanges will complete the system.

Selmer W. Beckman is president and Floyd Hoff is manager of the Park Region company.

S. H. Bass Made Assistant Comptroller of IT&T

Election of Sterling H. Bass as assistant comptroller of International Telephone & Telegraph Corp. was announced by Edmond H. Leavey, president.

Mr. Bass has been with IT&T since 1952, serving as comptroller and treasurer of Kellogg Switchboard & Supply Co., the corporation's communications division. In his new capacity, Mr. Bass will co-ordinate the accounting activities of the corporation's domestic operations.

Edward P. Socha, who had been assistant comptroller at Kellogg, has been named to succeed Mr. Bass.

Ore. Company Asks Raise

The Oregon Public Utility Commissioner on June 13 was to have heard the rate raise application of the Aurora Mutual Telephone Co. Ltd.

A Shadow Cast Before

"Someone has said of a fine and honorable old age that it was the childhood of immortality."—PINDAR.

Is YOUR Brush Control Problem "Different"?

WHATEVER YOUR PROBLEM, YOU'LL FIND THERE'S A

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Chemical control of brush—for line and roadside clearance and other purposes—has come a long way in a few short years. Weedone Brush Killers, originated by the American Chemical Paint Company, were the pioneers in chemical brush killing. Now immensely diversified, these fine products are still the leaders in the field. Today there is a Weedone Brush Killer specifically formulated for practically every need. Each is selective, effective, completely reliable.

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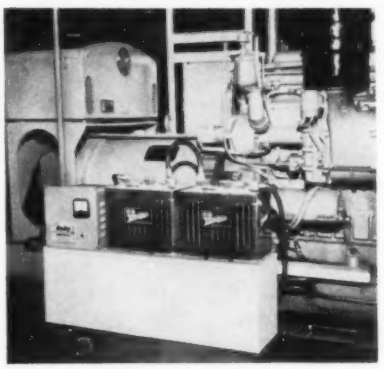
News on New Products

POWER PACKAGE—A new power package of C & D Batteries, Inc. AutoReg® silicon charger and PlastiCal® batteries, recently introduced, is reported to assure positive starting power for emergency standby engines. Both charger and batteries are specifically engineered to work together as an efficient unit which guarantees full power when needed. The company says the new power package requires virtually no maintenance, with up to 25 years of service, depending on the battery type selected.

An innovation in the field of emergency starting power, the compact power package for the first time combines C & D's lead-calcium plate battery with C & D's AutoReg silicon charger. The combination provides a trouble-free power package that gives many times the life of conventional charger-battery combinations, the manufacturer says.



The power package of charger and battery comes complete with drip-proof housing for wall or floor mounting. Because of its simplicity, the AutoReg charger requires only minimum space. In addition, the company reports that its lead-calcium batteries when coupled to AutoReg chargers require watering no oftener than once a year.

The new AutoReg charger is described by C & D as performing as a constant-current charger until the battery is almost completely recharged. At that time, the constant-voltage characteristic takes command, forcing the charging current to decline very rapidly to the low-float rate required for lead-calcium plate batteries.

No manual switching is required. Charging voltage never exceeds the voltage at which a battery begins to emit gas, the company says, thus eliminating the basic cause of water dissociation. As a result, water additions are fewer, and maintenance is held to a minimum.

Silicon rectifiers are used in conjunction with specially designed transformers and allied components. Because the silicon rectifiers are hermetically sealed, charger operation cannot be affected, the C & D company reports. Aging taps are not required. In addition, the charger system can withstand a dead short across the output terminals for an indefinite period without damage to the charger or its components.

The battery used in the combination unit is the same lead-calcium plate battery used in telephone, utility, carrier, and microwave installations, as well as for starting Diesel locomotives.

TELEPHONY PUBLISHING CORP.
608 S. Dearborn St.
Chicago 5, Ill.

Please have the manufacturer send me without obligation the literature indicated by the following numbers:

NP893_____; NP894_____; NP895_____; NP896_____;

NP897_____; NP898_____; NP899_____; NP900_____;

NP901_____; NP902_____; NP903_____; NP904_____;

NP905_____.

Name.....Title.....

Company.....

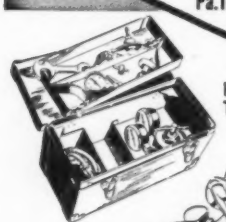
Street.....

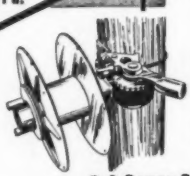
Town and State.....

7/5/58

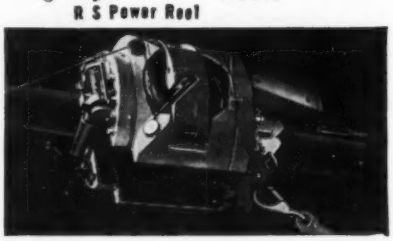
GENERAL MACHINE PRODUCTS COMPANY, INC.
Old Lincoln Highway at Pa.Turnpike, Trevose, Pa.

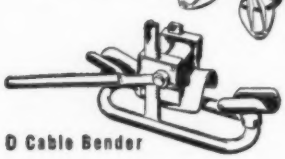
Aerial Tents
Cable Benders
Cable Blocks
Cable Lashers
Coaxial Cable Tools
Lashing Wire Clamps and Grips
Portable & Power Reels


Pressure Testing Kit


R S Power Reel

C R Power Reel




O Cable Bender

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B, C, D, E & G Cable Lashers
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Over 500 various items of Line Construction Tools, Maintenance & Pressure-Testing Equipment in stock for immediate Shipment

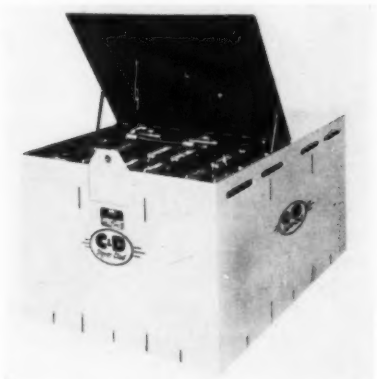
SPECIALIZED COMMUNICATIONS EQUIPMENT SINCE 1918 GMPCo

A sudden demand to start the emergency standby power engine merely discharges the battery over a short period of time. Once the engine is started, the charger goes to work putting energy back into the battery at a high rate until the battery levels off at a fully charged condition. Request NP893.

•

TYPE HD BATTERY—A new 31-inch-high battery, called Type HD, and featuring 145-ampere-hour plates has also been announced by C & D Batteries, Inc. The new battery, an addition to the Slyver-Clad® line, provides the highest capacity available in batteries of this height, the company maintains.

In producing the Type HD battery, C & D says it has provided the extra capacity in the battery-tray size that



previously held cells with 100 A.H. plates.

Because there is no change in tray dimensions, trucks in the 4,000-pound range and up using a 31-inch battery can be equipped with the extra-capacity C & D Type HD batteries. This will enable them to perform extra work and operate many power attachments without running down before the end of a duty cycle, the manufacturer reports.

The construction method used in the Type HD battery eliminates "shedding" of plates as a determining factor in battery life and greatly reduces the space required for sediment. By filling the space thus saved, in cells having industry standard dimensions, with longer and thicker plates, the C & D company says higher capacity is provided. This use of larger plates and improved materials, plus electronically controlling plate uniformity, has made the new high capacity possible.

The new Type HD battery is supplied with Hi-Impac cell containers and covers. This shock-resistant material is described as practically eliminating possible damage to battery cells caused by dropping, collision between trucks, or from the impact of heavy objects falling on the battery. Request NP894.

SUPER-SPEED PRINTING REPERFORATOR—The world's fastest message printer and code puncher, the TT-195 typing reperforator, has been developed by Kleinschmidt Laboratories, Inc., a subsidiary of Smith-Corona, according to a statement from the Kleinschmidt company.

The device, one of the first in a new family of super-speed combat teletypewriter units, was developed for the U. S. Army Signal Research and Development Laboratory. The company says the unit prints out messages at 750 words a minute which is equivalent to 75 characters per second. This is 12 times faster than the average typist and five times faster than normal conversation.

The new reperforator has no ordinary typing keys. Instead, a whirling wheel rimmed with letters prints the high-speed messages. The wheel spins at 3,750 revolutions a minute or as fast as the wheels on a car going 500 miles an hour, the Kleinschmidt Laboratories report. At the precise instant the correct letter comes into position, a tiny hammer strikes the paper against the type wheel. The hammer weighs 1/280 of an ounce and uses an impact time

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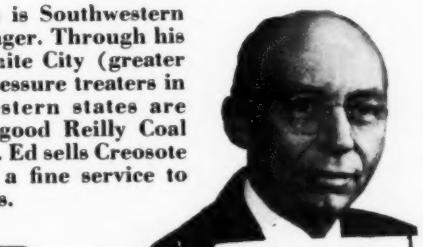
COME TO REILLY

Ed Goodman is Southwestern District Manager. Through his office at Granite City (greater St. Louis) pressure treaters in ten southwestern states are served with good Reilly Coal Tar Creosote. Ed sells Creosote and renders a fine service to his customers.



Ernie Rouland's customers, as all Reilly Creosote customers, get a chemical analysis of their shipment on the invoice. They know it has been checked and approved, and that it is ready for use upon arrival.

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Take all your outdoor measurements this modern, time saving way. ROLATAPE reduces the risk of human error, since it records precise measurements in feet as it is rolled along—automatically and in full view of the operator. Sturdy, lightweight; equipped with automatic brake and built-in stand. Handle folds compactly.

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of something less than 20 microseconds.

The company says this action gives a clear, sharp, perfectly registered character on the tape. The type wheel is shifted axially to provide figures-and-letters operation. The shifting is accomplished in approximately 4 milliseconds. Simultaneous printing and punching of a character takes approximately one-half millisecond. The feed of the tape, according to reports, is accomplished in 2 milliseconds.

Perfection of the technique used in the TT-195 reperforator is said to be a major breakthrough in the field of mechanical printing. It brings the speed of mechanical printing into a field heretofore occupied by non-mechanical printing.

The reperforator types out messages on ⅞-inch paper tape, at the same time punching out coded holes. Tape spews

from the printer at more than 7½ inches per second, according to the company. The chad which is produced by the punching operation is removed by a motor-driven blower.

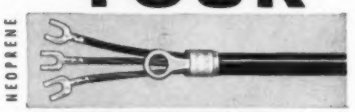
The tape messages can be relayed rapidly to other points or they can be printed on the spot in page form by automatic typewriters. The device receives either sequential or simultaneous signals in the Baudot code, the company states. The internal distribution and selection of these signals is achieved by transistorized circuitry. Transistorized circuits are also used for complete control of the high-speed mechanical punching and printing unit.

Kleinschmidt Laboratories, Inc., says the use of transistors makes possible the compact size of the unit (13 inches wide by 13 inches high by 18 inches deep) and its relatively light weight (55 pounds).

The high-speed reperforator is described as departing radically from concepts now in use in printing devices. It uses energy stored in a number of elastic impact devices which accomplish punching and printing on paper tape.

CORDS BY *Runzel*

YOUR



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Are you familiar with the features of these fine cords?

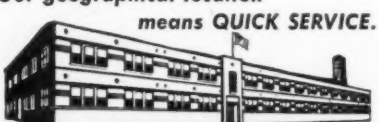
NEOPRENE covered cords are a highly serviceable cord, extensively used in a wide variety of services. They are moisture and grease proof . . . easy to keep clean.

NYLON covered cords are a relatively new development in telephone cords. Their fine smooth texture makes them the preferred cords for switchboard use. They give long service. Preferred by operators because of their fast, easy handling.

COTTON cords are in standard use everywhere. Their fine woven wrap makes them very serviceable for all around purposes.

Take your choice—Neoprene, Nylon or Cotton. They're all high quality cords made in accordance with Runzel high standard of quality. We carry a large stock of cords for every purpose.

Our geographical location means QUICK SERVICE.



RUNZEL
Cord and Wire Co.
4723 W. MONTROSE AVE.
CHICAGO 41, ILL.

In the past, impact and bounce have been a problem in high-speed mechanical devices and great effort has been made to control and avoid them. In contrast, this machine makes use of impact and bounce. Because of their elastic character, the impact hammers literally "bounce" off the rapidly rotating type wheel, thereby permitting the punching and printing at extremely high speeds.

So far, the new reperforator is scheduled for use in the Army's high speed communications system of tomorrow.

For commercial use, the company points out that the primary advantage of using tape, over transmitting directly from a teleprinted keyboard, is that the tape can be punched free of errors and then used to transmit messages at very high speeds.

Kleinschmidt expects to combine with Smith Corona to develop new machines needed in various phases of integrated data processing. One logical future market area, the company says, would be the adaptation of the electric typewriter and the Kleinschmidt teleprinter to auxiliary "feeder" equipment for electronic computers. Such a machine would feed data into a computer, take out the processed information, and then relay it to other desired points.

Another potential market is in equipment for relaying business data, such as orders, production schedules, and billings, from one source to many recipients via coded tape transmissions and automatic switch devices. Request NP895.

•

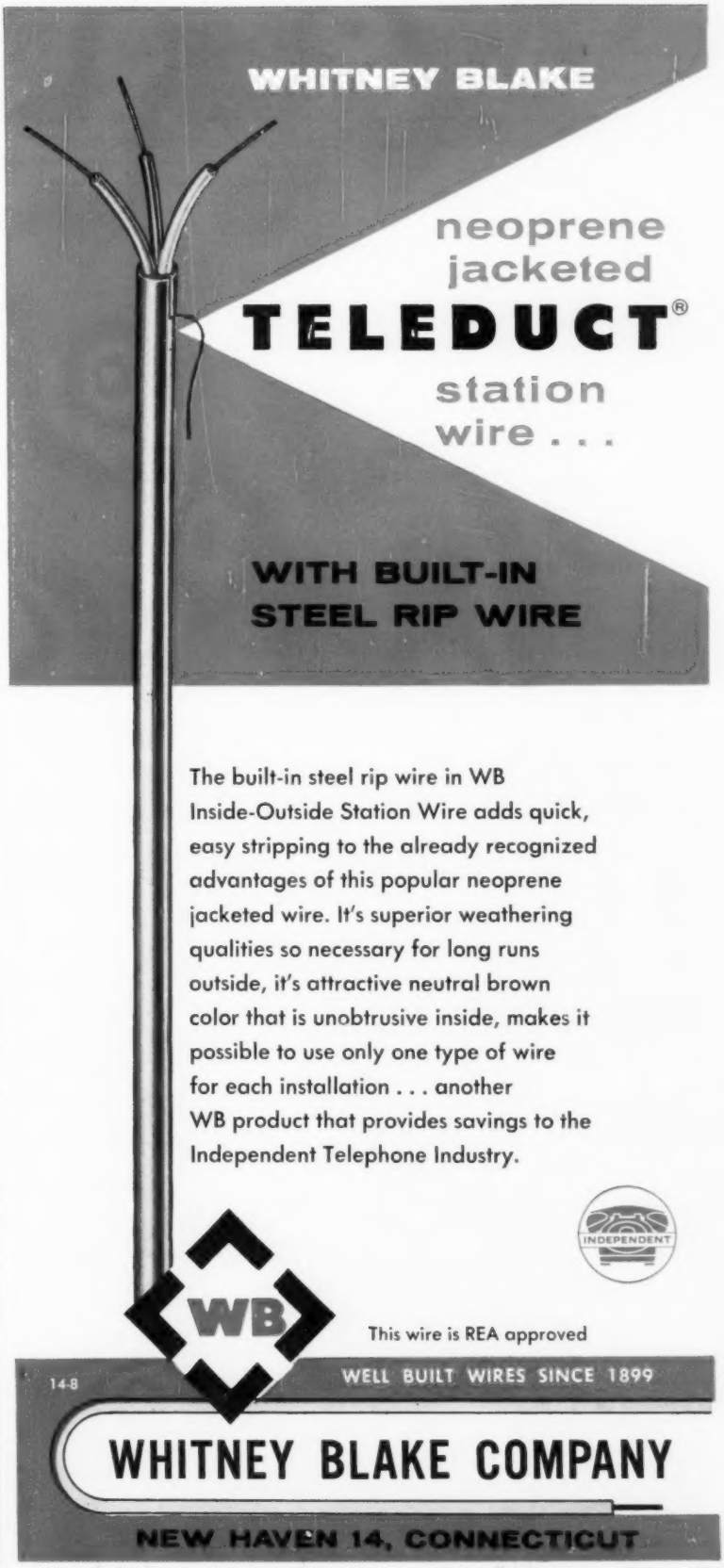
SMALL-POWER APPLICATION BATTERIES—New flat-plate stationary storage batteries—designed to meet small-power applications in industry at moderate cost—have been announced by Exide Industrial Division of The Electric Storage Battery Co.

Despite their reported economy for small-power applications, the new batteries, designated PWA, according to the company, feature:

(1) Patented corrosion-resistant grid material.
(2) A special explosion-control device.
(3) Shock-absorbent plastic containers.

Meeting specifications for PBX and PAX switchboards and other roles in telephone central exchanges, the company says the new lead-acid batteries also will be used in microwave systems, emergency lighting, laboratory, instruments, switchgear, and other similar industrial applications.

Exide PWA batteries will be ear-


WHITNEY BLAKE
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TELEDUCT®
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WITH BUILT-IN
STEEL RIP WIRE
The built-in steel rip wire in WB Inside-Outside Station Wire adds quick, easy stripping to the already recognized advantages of this popular neoprene jacketed wire. It's superior weathering qualities so necessary for long runs outside, it's attractive neutral brown color that is unobtrusive inside, makes it possible to use only one type of wire for each installation . . . another WB product that provides savings to the Independent Telephone Industry.
INDEPENDENT
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This wire is REA approved
14-8
WELL BUILT WIRES SINCE 1899
WHITNEY BLAKE COMPANY
NEW HAVEN 14, CONNECTICUT

marked in two- and three-cell polystyrene containers, with either seven or 13 plates per cell. The seven-plate batteries are rated at 50 ampere-hours, at the eight-hour discharge rate. Thirteen-plate sizes are rated at 100 ah.

The PWA batteries have positive plates containing Silvium, a patented alloy of silver, lead, and other metals. Exide says that Silvium has the highest resistance to electrolytic corrosion of any grid alloy used in lead-acid storage batteries. It extends expected battery life and provides protection against damage caused by overcharging.

The special explosion-control device is a safety feature which the company reports is used successfully on other Exide stationary batteries for venting gases. This device consists of a polystyrene hood or baffle over the plates which collects the gases and channels them through a cylinder vent and plastic vent plug.

Joining Exide's other lines of plastic-container stationary batteries, the PWA batteries are described as having jars and covers of light-weight, heat-resistant, shock-absorbent polystyrene. This type of container recently was made standard on all Exide lines of stationary batteries. Heavy negative plates in the new batteries are designed to give balanced plate life and performance.

Ribbed microporous separators and spun glass Vitrex retainers which the company says are both highly resistant to chemical and electrolytic action insulate the plates. Uniformly high porosity of the separators permits free passage of electrolyte, assuring delivery of high rates of current at maximum

voltage. The retainers hold the active material firmly in place at the grids.

Elements of the PWA batteries are suspended from the cover, while polyethylene supports at the bottom of the jars hold the separators in position.

Plastic covers, the company states, are bonded permanently to the jars to prevent leakage of electrolyte. Seal nuts and gaskets prevent seepage around the heavy terminal posts. For convenience in maintenance, electrolyte level lines are marked on all four sides of the jars.

PWA batteries are supplied charged and filled with electrolyte, or dry-charged. Request NP896.

•

REEL TRAILER—Spring suspension for the load, frame, and axles is described as standard equipment on a new cable reel trailer now being manufactured by McCabe-Powers Body Co. The new unit, designated the Powers-

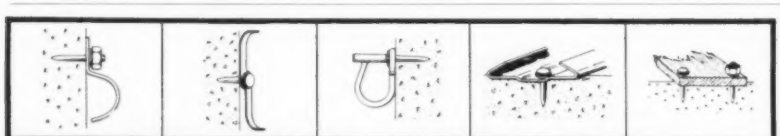
American Series CM "Cable-Master" Cable Reel Trailer, is designed to handle reels up to 52 inches in width and 96 inches in diameter.

In the accompanying illustration, the torsion bar springing mechanism is shown in a partially "loaded" position, with twist in the torsion bars exaggerated to clearly depict the springing action. The bars, which are anchored at one end, twist very slightly in actual operation, according to the company.

" 'Cable-Master's' torsion bar springing eliminates trailer bounce and carries the load evenly at all times," a company spokesman said. "The springing mechanism smooths out road bumps, and, most important, absorbs harmful jolts which would speed deterioration of the trailer and tires," he added.

When the trailer is traveling, the springing mechanism is constantly in motion. Wheels can move up and down freely, McCabe-Powers reports, thus minimizing the movement of the frame and load as the trailer passes over bumps or low spots. Heavy-duty neoprene cushions are installed between the hydraulic reel-lifting cylinders and the reel support assembly to furnish additional shock absorbing protection for the trailer.

The "Cable-Master" trailer can be loaded by one man, before or after hook-up to the towing vehicle, without



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HILTI® T-25H DRIVE TOOL

Fastens into

CONCRETE, MASONRY, COMPOSITION BLOCK, BRICK...EVEN STEEL!...without DRILLING, PLUGGING OR EXPLOSIVES!

ALL YOU NEED IS 1. A HAMMER
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and you'll get 85% more holding power with minimum penetration to safely and economically fasten cable-clamps, wire-ties, metal mouldings, wire-clasps, drive-rings, bridle-rings, back-boards, terminals, etc.

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the aid of a winch or crane, the company says. The reel is elevated to carrying position by independent hydraulic cylinders which are actuated separately or simultaneously by means of a hand-operated pump. The operator can raise or lower either side of the reel to facilitate cable removal when the trailer is on uneven terrain.

In addition to the construction features shown on the accompanying photos, electric brakes and filtered hydraulic system are described as being standard items of equipment.

Optionals include directional signals, fender splash aprons, reel brake, adapter for 24-inch reels, automatic braking assembly required by Interstate Commerce Commission (ICC) laws, tool box, and stabilizing jacks.

"Cable-Master" trailers can be furnished in 8, 10, and 12-thousand-pound capacities. Request NP897.

•

GUY GUARDS — An aluminum guy guard, available in 7 and 8-foot half-round styles is now being offered by the

A. B. Chance Co. These 16-gauge guards feature high visibility, and they retain this visibility even under corrosive conditions, the company says. Turned-in edges give added strength and safety.

Chance aluminum guy guards are described as being designed for quick and easy installation. A tight-gripping, non-scarring hook is on the top of the guard for quick attachment to the guy wire. A bolt-and-keeper fastener at the bottom attaches between the guy wires leading from the rod eye, to the guy-wire clamp, or through the eye of a preformed grip.

Each guard has three holes so that

WHAT'S NEW AT SUTTLE

Now—5 Models Suttle Drive-Up-Walk-Up Booths

(With Bright Yellow Hoods)

Choose from one of five models of Suttle's low cost "Phone-From-Your Car" Booths — two Drive-Up models, two Walk-Up models, and one Walk-Up with Building Mount—all traffic-type structures *designed* for the job.

Installation of all models is simple and inexpensive. *Five* of these booths can be installed for the same cost as *two* of other outdoor types.

"Phone From Your Car" feature increases revenue

Suttle Drive-Up Booths, to be installed on toll roads nationally, have proved to be as much as 300% more profitable than other types of outdoor full length booths because of ease of use. You save on maintenance costs, too. No rusty hardware or mechanical parts to fail. On actual installations, after *two years* of tests, no maintenance costs were incurred on either coin pay phones or booth structures in *all* weather.

Suttle Drive-Up and Walk-Up Booths use standard A.E. or W.E. paystations, the Drive-Up unit using a standard 9' Koiled Kord.

Model DUO	Drive-Up, mounted on concrete with tripod and skirt (sign post, signs, lights optional)	$121.00
Model DUI	Drive-Up, mounted *in* concrete (sign post, signs, lights optional)	$99.50
Model WUO	Walk-Up mounted on concrete with tripod and skirt (sign post, signs, lights optional)	$121.00
Model WUI	Walk-Up, mounted *in* concrete (sign post, signs, lights optional)	$99.50
Model WUOBM	Walk-Up, mounted on concrete, with building mount and bracket, tripod and skirt (for mounting adjacent to and on buildings, posts, etc.)	$117.00

Complete Installation instructions supplied with each unit.

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EXTENDS SERVICE FAST IN RAPIDLY GROWING AREAS

Made in a variety of combinations from 2 to 16 pair, WB Multi-pair Distribution Wire affords a fast, economical method of extending service where needed. This wire has been used successfully to temporarily replace storm damaged circuits, to serve during relocation of lines due to road building or other construction and in many other ways. When used for temporary service it may be salvaged and re-used.

WB Multi-pair Distribution Wire is light in weight, is self supporting and is shipped in long lengths.

INDEPENDENT

WB

7-8

WELL BUILT WIRES SINCE 1899

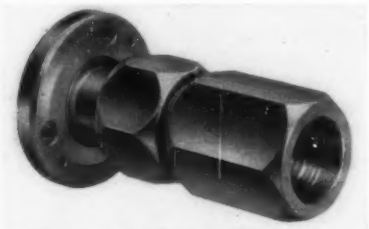
WHITNEY BLAKE COMPANY

NEW HAVEN 14, CONNECTICUT

it can be adjusted to cover the anchor rod to the ground line. Request NP898.

•

ALUMINUM CONNECTORS—An all-aluminum connector for its new semi-flexible transmission line (trademark, Spir-O-line), has been announced by



Prodelin, Inc. One feature of the Spir-O-line cable and connector is an assembly which, according to the company, does not require special tools, and employs simple techniques that eliminate the need for lengthy field assembly time. The connector can also be assembled hand-tight without wrenches for laboratory or emergency application.

Only common tools of the hardware store variety are said to be required for assembling Spir-O-line cable and connectors. Spir-O-line connectors can be re-used without redressing tubing or replacing connector parts. Request NP-899.

•

METRIC MEASURING WHEEL—A new measuring wheel that records accurate measurements in meters and cen-

timeters has been introduced by Rolatape, Inc.

Called the "Distometer," the instrument records measurements in meters as it is rolled along by means of a built-in totalizer. Centimeters are indicated by a recessed scale around the

wheel's circumference. Rolatape says a clearly audible click indicates each meter and a loud bell tone denotes each 50-meter mark, after which the cycle is repeated.

The distometer enables one man to obtain accurate measurements quickly without need for stooping or stretching, the company states. A retractable handle extends and locks at a 34-inch height. When not in use, it can be folded so that the wheel can be carried anywhere conveniently. Made of steel, the wheel is rimmed with two neoprene tires which assure positive traction on most surfaces indoors and outdoors. Designed to measure efficiently from line to line, and from wall to wall, the wheel is also useful in obtaining measurements around curves, over contours, and vertically.

The circumference of the wheel is exactly one meter 39.37 inches, diameter is 12½ inches, and weight is 6 pounds. It is finished in instrument-black baked enamel and comes equipped with leather carrying case. Request NP900.

•

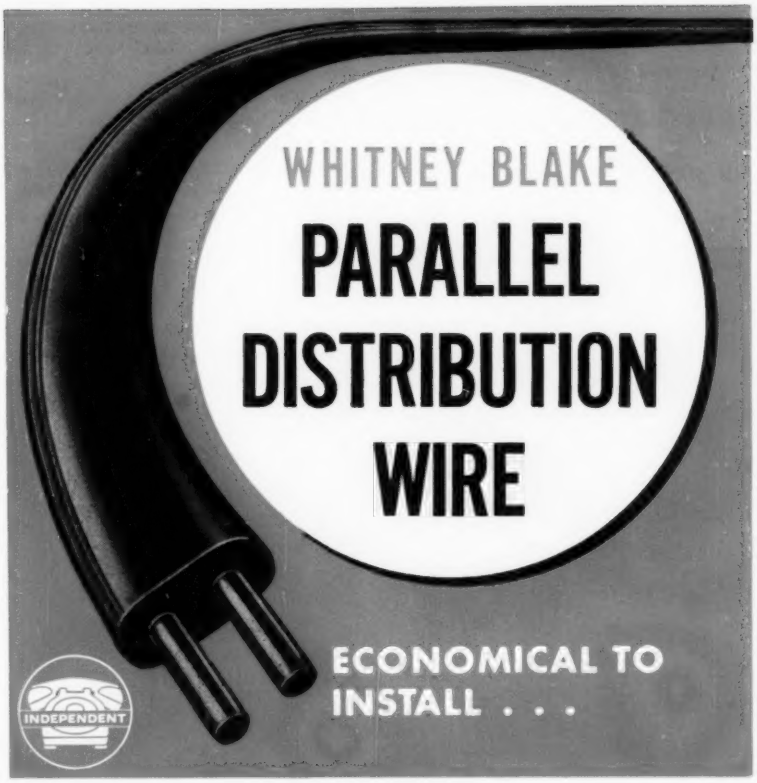
MULTIPLE CONCRETE CONDUIT—The Chicago Precast Products Corp. announces the production of Condex, a

multiple concrete conduit whose joining and laying process is easy enough to enable a five-man crew to lay more than 1,600 trench-feet in one day.

This concrete conduit, which has been successfully used by several Bell System companies, is described as "a well-formed unit of conduit of dense-textured concrete."

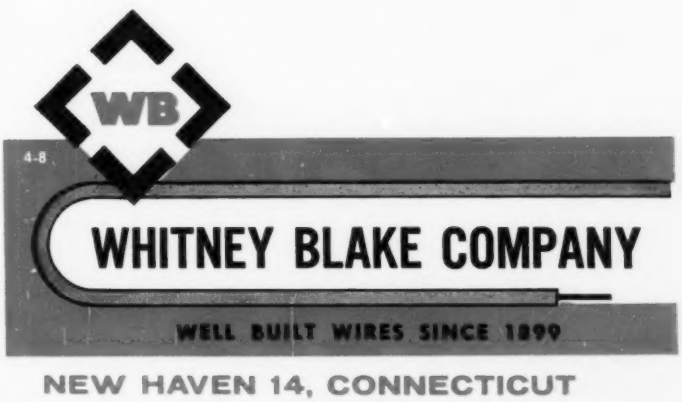
It has about the same outside dimensions as multiple tile conduit but has a 3½-inch-diameter round duct instead of the square bore found on other types of conduit.

Condex is made in sections 3 feet long, each section having both a bell end and a plain end so that the conduit can be joined in sewer tile manner. The joint thus formed is sealed with a bituminous compound applied with a



A minimum of labor is involved in installing WB Parallel Distribution Wire. It is ideally suited for long span construction. The high molecular weight polyethylene jacket is unaffected by adverse atmospheric conditions and also protects against transmission interference caused by tree branches, kite strings and other foreign objects falling across open wires.

WB Parallel Distribution Wire is made to the same high standards of quality that have maintained Whitney Blake leadership in the Independent Telephone Industry.



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pressure gun. The manufacturer claims that it is possible to maintain tighter dimensional tolerances with concrete conduit than with other types.

Weighing more than clay conduit, a six-duct section of Condex weighs about 180 pounds as compared to 120 pounds for a similar clay section. The additional weight is caused by the bell on concrete conduit and the difference in material.

After manufacture from a concrete mix composed of 1 part cement, two parts sand and three parts gravel, the conduit is steam-cured for 12 hours.

Laboratory tests show that water absorption of this conduit is 5 per cent of dry weight, and that pH factor is 11.5 per cent. Other tests demonstrate that Condex will withstand loads ranging from 10,000 to 42,000 pounds per linear foot.

Besides the standard sections, mitered sections one foot long with a five-degree offset are also available.

Concrete conduit can be joined directly to tile conduit through the use of special connectors.

The manufacturer says that due to Condex's availability all over the country (there are plants in eight cities), a supply of this conduit can be maintained on hand in the manufacturer's yard and it can be delivered as needed. This limited handling reduces breakage to less than one per cent, it is stated.

The company claims that Condex can be dropped from a truck directly onto average soil without breakage if the unit is dropped directly on the plain end rather than the bell end.

Field tests show that the tensions required to pull cable into Condex appear to be comparable with tensions recorded in pulling similar-sized cable into other types of conduit. Sheath scratches are also reported to be similar. Request NP901.

•

CABLE LAYING ATTACHMENT—A new attachment for standard American Tractor Equipment Corp. (ATECO)

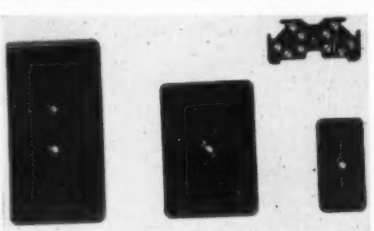
tractor-mounted rippers speeds laying of underground cable, plastic pipe, or direct burial conductor, to depths of 72 inches by eliminating trenching.

In operation, a tractor carrying a standard ATECO ripper makes one or two passes over the cable route, laying the cable on the last pass. According to the manufacturer, cable or pipe to 3-inch diameter can be laid at substantial savings in time and cost. Request NP902.

•

TERMINAL CONNECTING BLOCKS — With the manufacture of its own standard 10-terminal connecting blocks and three sizes of plastic connecting block covers, Suttle Equipment Corp. states it can now make deliveries from stock.

The 44A Type block with 101A, 101C, and 101D plastic covers (to prevent shorting out), is used with key or but-



Shown above, from left to right, are the S.E. 101D cover for four standard 10-terminal blocks (or 40 terminal points); the S.E. 101C cover for two or three blocks; and the S.E. 44A standard 10-terminal block.

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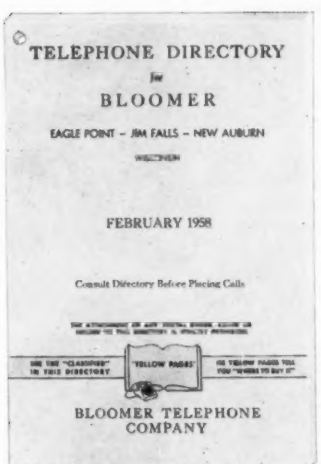

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ton telephones with individual covers to house up to 40 terminals. Wooden backboards are optional as many users prefer to mount the blocks on supporting wall surfaces.

The S. E. 44A 10-terminal connecting block and cover is the industry standard and meets or exceeds all requirements, according to the manufacture. Covers for these blocks are described as being made of highest dielectric material and are completely non-shorting. They are available in either brown or ivory.

The line includes the S. E. 101A cover for one standard block; the S. E. 101C cover for two or three blocks; and the S. E. 101D cover for four blocks, or a total of 40 terminals. Request NP903.

•

ELECTRONIC COMMUNICATION SYSTEM — An all-new communication, signaling, safety, and teaching system

for schools has been introduced by the DuKane Corp.

The equipment is available to telephone companies, for installations in their local schools, through their regular sources of supply, the DuKane company states.

Through the use of an electronic network which combines into one system the functions of a public address system, emergency alarms, fire sensing, and detection equipment, telephone-intercoms, clocks and class-break signals, and closed-circuit TV, the manufacturer claims greater efficiency and educational effectiveness at far lower cost than previously possible.

DuKane calls its system MCS (Multipurpose Communication and Signaling). In a typical school, the MCS system makes possible such varied functions as:

(1) A social studies class watching a TV news broadcast.

(2) A music class listening to high fidelity reproduction of music from records, tape, or radio.

(3) Teachers able to confer with each other privately by telephone.

(4) The office able to call a student out of class by telephone, without disturbing other students.

(5) A bedridden student able to listen in on the whole day's class work and ask questions of the teacher.

(6) When the school is closed, a sudden rise in temperature automatically setting off the fire alarm, signaling the fire department, and indicating on a lighted panel exactly where the fire is.

(7) The dramatics class televising its own work.

(8) A distinguished visitor able to appear in all classrooms at once via TV.

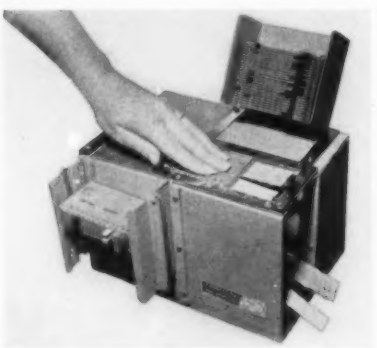
(9) In case of fire or emergency, specific voice instructions to control panic and assure orderly evacuation.

DuKane engineers emphasized that the system is not a "dream system" for some time in the future, but is ready for installation now in schools anywhere in the U. S.; or, parts of the system can be installed with provision made for future installation of the remaining features.

The system is put together on a "building block" principle, which the manufacturer states permits easy and economical expansion to accommodate additions to the school or to add new features and services. Request NP904.

•

QUIK-STRIPPER—The "Quik-Stripper," which can remove plates and cards from all commonly used styles of Ad-



dressograph frames, including frames holding more than one plate, has been announced by the Addressing Machine Co. of California.

The device is equipped with two hoppers: one to hold unstripped frames and one to hold stripped frames. The operator, working from the back of the frame, slides a frame over an opening in the tabe top of the Quik-Stripper. Plates and cards fall out and travel down a chute into a waste basket at the side of the table on which the device is used.

When stripping frames with this device, the company says, the operator never touches the embossed plate or the ink on the plate. She works from the

back of the frame. It is, therefore, impossible for her to get grime on her fingers or ruin her finger nails.

Depending on the style of frame being stripped, the work is done two to five times faster than by hand, according to the company. Five basic models are available and each model has adaptors as extra attachments to permit handling more than one style of frame in the one basic unit.

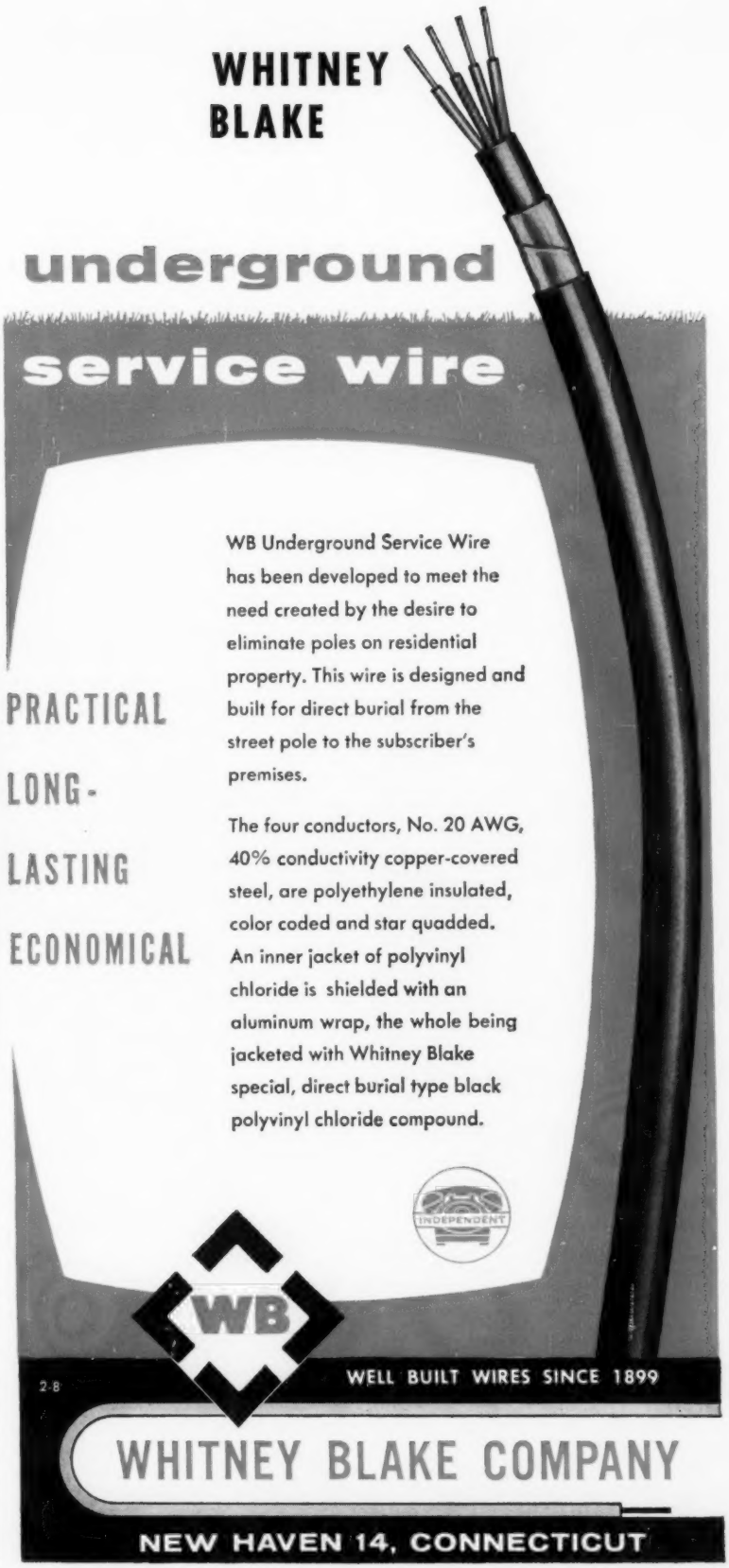
Special adaptors can be furnished to remove any one plate or combination of plates, with or without the index card. Request NP905.

Donald C. Power, president of the General Telephone Corp., is shown as Karl J. Schwing, chairman of the chemistry department of Upsala College, East Orange, N. J., places the academic hood on him. Mr. Power had just been awarded an honorary doctor of laws degree by Dr. Evald B. Lawson at the college's 65th commencement on June 9. Mr. Power was honored for his contributions both to education and to business.

M. L. Woolley Appointed To New Post at Stromberg

Myles L. Woolley, veteran sales engineer with Stromberg-Carlson, has joined the telecommunication industrial sales department, according to an announcement by T. C. Thompson, general sales manager of the Telecommunication Division. Stromberg-Carlson is a division of General Dynamics Corp.

Under the direction of E. R. Sears Sr., industrial sales manager, Mr. Woolley will concentrate his sales engineering efforts in the industrial carrier and multiplex field.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WB Underground Service Wire has been developed to meet the need created by the desire to eliminate poles on residential property. This wire is designed and built for direct burial from the street pole to the subscriber's premises.
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Model JK—COMMUNICATION TEST SET
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Model M—INTER COMMUNICATION UNIT

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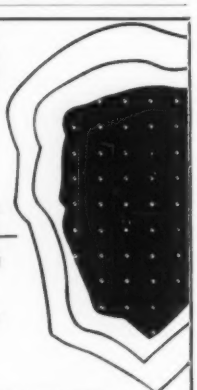

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M. L. WOOLLEY

Mr. Woolley has been in telecommunication for 35 years and with Stromberg-Carlson for 18 years, serving in various sales and engineering capacities in three of the company's branch sales offices, as well as in the home office.

He returns to Rochester from the Kansas City branch sales office, where, for the past nine years, he has served Independent telephone companies throughout the Midwest. Previous to that, in Rochester, he held positions in the engineering department and national sales engineering. Earlier, in the company's San Francisco branch sales office he served West Coast companies in the position of sales engineer and sales representative.

Prior to joining Stromberg-Carlson, Mr. Woolley was associated with the Pacific Telephone & Telegraph Co.; Radio Corporation of America; Radio Sales & Service, Seattle, and the Western Electric Co.

A native of Sioux City, Iowa, Mr. Woolley received his early education there and in Poughkeepsie, N. Y., before joining the U. S. Navy in 1918. Following his discharge from service, he attended the University of Washington, where he majored in engineering.

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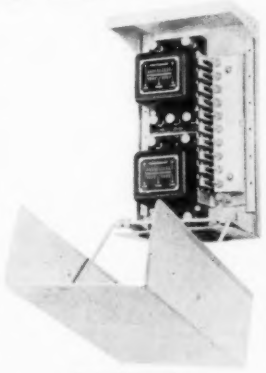

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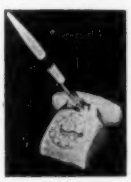

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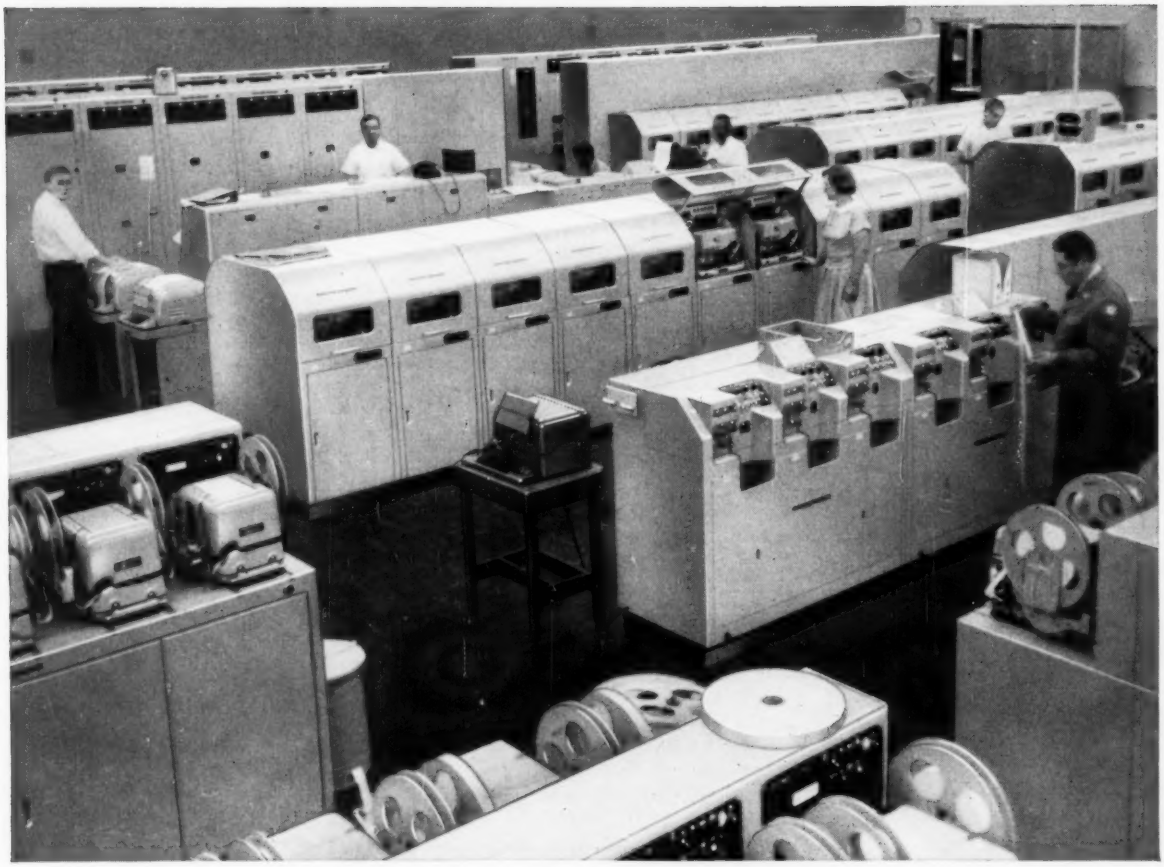

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